



US005225570A

United States Patent [19]

[11] Patent Number: **5,225,570**

Williams et al.

[45] Date of Patent: **Jul. 6, 1993**

[54] **5-HETEROCYCLIC-SUBSTITUTED
OXAZOLIDINE DIHALOACETAMIDES**

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[21] Appl. No.: **212,621**

[22] Filed: **Jul. 1, 1988**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 84,786, Aug. 13, 1987.

[51] Int. Cl.⁵ **C07D 417/04; C07D 263/02;
A01N 43/76**

[52] U.S. Cl. **546/275; 548/215;
548/216; 548/147; 548/204; 544/336; 504/100;
504/107; 504/105**

[58] Field of Search **548/215, 216, 147, 204;
546/275; 544/336**

[56] References Cited

FOREIGN PATENT DOCUMENTS

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[57] ABSTRACT

The disclosure herein relates to a new family of haloalkyl oxazolidinyl derivatives as antidotal compounds to reduce injury to crop plants by a variety of herbicides. The antidotal compounds are characterized particularly by having heterocyclyl or spiroheterocyclyl radicals attached to the 5-position of haloalkyl oxazolidine compounds and are especially useful as in-can antidotes against injury by acetanilide and thiocarbamate herbicides to corn, sorghum, soybeans, wheat, rice and other crops.

18 Claims, No Drawings

5-HETEROCYCLIC-SUBSTITUTED OXAZOLIDINE DIHALOACETAMIDES

RELATED APPLICATION

This application is a continuation-in-part of copending U.S. patent application Ser. No. 07/084,786, filed Aug. 13, 1987.

FIELD OF THE INVENTION

Herbicide antidotes are well-known crop protection chemicals. Of particular interest herein is a class of certain 5-heterocyclic-substituted oxazolidine and thiazolidine dihaloacetamide compounds found effective as antidotes for protecting crop plants from herbicide injury.

BACKGROUND OF THE INVENTION

Many herbicides injure crop plants at herbicide application rates necessary to control weed growth. Accordingly, many herbicides cannot be used for controlling weeds in the presence of certain crops. Uncontrolled weed growth, however, results in lower crop yield and reduced crop quality inasmuch as weeds compete with crops for light, water and soil nutrients. Reduction of herbicidal injury to crops without an unacceptable corresponding reduction of herbicidal action on the weeds can be accomplished by use of crop protectants known as herbicide "antidotes" or "safeners".

There are described in the literature various dihaloacyl oxazolidinyl and thiazolidinyl compounds containing a variety of substitutions on the oxazolidinyl or thiazolidinyl moiety, which compounds are known as antidotes, or safeners, for various herbicidal compounds in various crops. For example, a number of patents describe such dihaloacyl oxazolidinyl compounds having as substituents on the oxazolidinyl ring hydrogen, alkyl, cycloalkyl, spirocycloalkyl, alkoxyalkyl, alkanol, heterocycyl, aryl or aryloxyalkyl moieties, which compounds are used as antidotes for herbicides such as α -haloacetanilides or thiocarbamates in various crops. Typical of such patents are U.S. Pat. Nos. 3,959,304, 3,989,503, 4,072,688, 4,137,070, 4,124,372, 4,186,130, 4,197,110, 4,249,932, 4,256,481, 4,618,361 and 4,708,735 and EP Nos. 0054278, 0,147,365, 190,105 and 0,234,036.

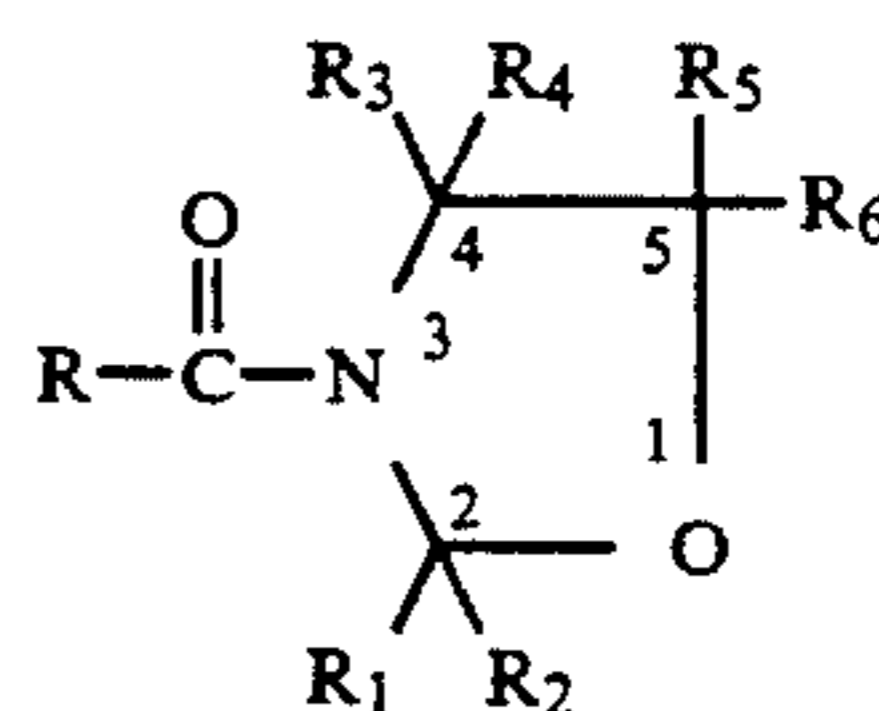
None of the above patents or any other known to the inventors herein disclose any dihaloacyl oxazolidinyl or thiazolidinyl compounds directly substituted with a heterocyclic radical in the 5-position. The above EP 190,105 disclosed one dichloroacetyl oxazolidine compound having a furyl radical in the 2-position; that compound is not within the generic scope of the defined dichloroacetyl oxazolidine antidotes in that patent. The EP 0,234,036 discloses a great variety of dichloroacetic acid amide derivatives including various heterocyclic radicals such as 1, 3-oxazolidines which may be further substituted in non-designated positions with any of a plurality of radicals including the pyridyl and piperidinyl radicals, but the patent fails to exemplify any such compounds.

An effective herbicide must provide a relatively high level of control of grassy or broad-leaf weeds, or both, in the presence of crops in addition to meeting several other criteria. For example, the herbicide should possess relatively high unit activity so that lower rates of herbicide application are feasible. Lower application rates are desirable in order to minimize exposure of the environment to the herbicide. At the same time, such

herbicide must be selective in herbicidal effect so as not to injure the crops. Herbicidal selectivity can be enhanced by use of an appropriate antidote in combination with the herbicide. But identification of an antidote which safens a herbicide in crops is a highly complicated task. Whether a compound or class of compounds provides efficacious antidote or safening activity is not a theoretical determination but must be done empirically. Safening activity is determined empirically by observing the complex inter-action of several biological and chemical factors, namely: the type of herbicide compound; the type of weed to be controlled; the type of crop to be protected from weed competition and herbicidal injury; and the antidote compound itself. Moreover, the herbicide and antidote must each possess chemical and physical properties enabling preparation of a stable formulation which is environmentally safe and easy to apply to the field.

SUMMARY OF THE INVENTION

A novel family of compounds useful as antidotes against herbicide injury to crops is provided by 5-heterocyclic-substituted oxazolidine dihaloacetamide compounds embraced by the general formula:



and agriculturally-acceptable salts thereof wherein

R is haloalkyl;

R₁ is C₁₋₄ alkyl, haloalkyl or phenyl;

R₂-R₅ are H or C₁₋₄ alkyl;

R₆ is a saturated or unsaturated C₅₋₁₀ heterocyclic radical containing 1 to 2 oxygen, nitrogen or sulfur atoms, optionally substituted with a C₁₋₄ alkyl or haloalkyl radical or halogen atom or with oxygen on a ring nitrogen atom; and

R₅ and R₆ may be combined to form a spiroheterocyclic ring as defined for the R₆ radical.

The term "haloalkyl" embraces radicals wherein any one or more of the carbon atoms, preferably from 1 to 4 in number, is substituted with one or more halo groups, preferably selected from bromo, chloro and fluoro. Specifically embraced by the term "haloalkyl" are monohaloalkyl, dihaloalkyl and polyhaloalkyl groups. A monohaloalkyl group, for example, may have either a bromo, a chloro, or a fluoro atom within the group. Dihalalkyl and polyhaloalkyl groups may be substituted with two or more of the same halo groups, or may have a combination of different halo groups. A dihaloalkyl group, for example, may have two bromo atoms, such as a dibromomethyl group, or two chloro atoms, such as a dichloromethyl group, or one bromo atom and one chloro atom, such as a bromochloromethyl group. Examples of a polyhaloalkyl are perhaloalkyl groups such as trifluoromethyl and pentafluoroethyl groups.

Preferred haloalkyl R members are dihalomethyl, particularly dichloromethyl, while the preferred haloalkyl R₁ member is a tri-halogenated methyl radical, preferably trifluoromethyl.

Where the term "alkyl" is used either along or in compound form (as in "haloalkyl"), it is intended to embrace linear or branched radicals having up to four carbon atoms, the preferred members being methyl and ethyl.

Also included in this invention are the stereo and optical isomers of compounds within the class defined by the above formula.

The heterocyclic R₆ member, alone or combined with the R₅ member to form a spiroheterocyclic radical through the 5-position carbon atom of the oxazolidinyl radical, can be saturated or unsaturated and contains five to ten ring members of which at least one member is a heterocyclic oxygen, nitrogen or sulfur atom. The heterocyclic ring may contain as many as four hetero atoms which may be the same or mixtures of said hetero atoms. The heterocyclic members of preference are the furanyl, thienyl and pyridinyl radicals. The heterocyclic ring may be substituted with one or more C₁₋₄ alkyl or haloalkyl radicals or with a halogen, preferably chloro, atom and with oxygen on a nitrogen hetero atom. As an R₆ member per se the heterocyclic ring must be attached directly to the 5-position of the oxazolidinone ring without any intervening moieties therebetween, e.g., an alkylene group.

It is further within the purview of this invention that in alternative embodiments, the oxazolidinyl radical may be substituted with a heterocyclic or spiroheterocyclic ring at the 2- and/or 4- carbon atoms, as described above for such substitutions on the 5- position carbon atom.

By "agriculturally-acceptable salts" of the compounds defined by the above formula is meant a salt or salts which readily ionize in aqueous media to form a cation of said compounds and a salt anion, which salts have no deleterious effect on the antidotal properties of said compounds or of the herbicidal properties of a given herbicide and which permit formulation of the herbicide-antidote composition without undue problems of mixing, suspension, stability, applicator equipment use, packaging, etc.

By "antidotally-effective" is meant the amount of antidote required to reduce the phytotoxicity level or effect of a herbicide, preferably by at least 10% or 15%, but naturally the greater the reduction in herbicidal injury the better.

By "herbicidally-effective" is meant the amount of herbicide required to effect a meaningful injury or destruction to a significant portion of affected undesirable plants or weeds. Although of no hard and fast rule, it is desirable from a commercial viewpoint that 80-85% or more of the weeds be destroyed, although commercially significant suppression of weed growth can occur at much lower levels, particularly with some very noxious, herbicide-resistant plants.

The preferred species of antidotal compounds according to this invention are

oxazolidine, 3-(dichloroacetyl)-5-(2-thienyl)-2,2-dimethyl-
oxazolidine, 3-(dichloroacetyl)-5-(2-furanyl)-2,2-dimethyl-, and
oxazolidine, 3-(dichloroacetyl)-5-(3-pyridyl)-2,2-dimethyl-

The terms "antidote", "safening agent", "safener", "antagonistic agent", "interferant", "crop protectant" and "crop protective", are often-used terms denoting a compound capable of reducing the phytotoxicity of a herbicide to a crop plant or crop seed. The terms "crop

protectant" and "crop protective" are sometimes used to denote a composition containing as the active ingredients, a herbicide-antidote combination which provides protection from competitive weed growth by reducing herbicidal injury to a valuable crop plant while at the same time controlling or suppressing weed growth occurring in the presence of the crop plant. Antidotes protect crop plants by interfering with the herbicidal action of a herbicide on the crop plants so as to render the herbicide selective to weed plants emerging or growing in the presence of crop plants.

As further detailed infra, while not necessary, the composition containing the herbicide-antidote combination may also contain other additaments, e.g., biocides such as insecticides, fungicides, nematocides, miticides, etc., fertilizers, inert formulation aids, e.g., surfactants, emulsifiers, defoamers, dyes, etc.

Herbicides which may be used with benefit in combination with an antidote of the described class include preferably thiocarbamates (including dithiocarbamates), acetamides, heterocyclyl phenyl ethers (especially phenoxypyrazoles), imidazolinones, pyridines, and sulfonylureas. It is within the purview of this invention that the novel class of antidotal compounds be used with other classes of herbicides, e.g., triazines, ureas, diphenyl ethers, nitroanilines, thiazoles, isoxazoles, etc., the individual members of which classes may be derivatives having one or more substituents selected from a wide variety of radicals. Such combinations can be used to obtain selective weed control with low crop injury in several varieties of monocotyledonous crop plants such as corn, grain sorghum (milo), and cereals such as wheat, rice, barley, oats, and rye, as well as several varieties of dicotyledonous crop plants including oilseed crops such as soybeans and cotton. Particular utility for the antidotal compounds of this invention has been experienced with various herbicides in corn, sorghum and soybeans.

Examples of important thiocarbamate herbicides are the following:

cis-/trans-2,3-dichloroallyl-diisopropyl-thiolcarbamate (common name "diallate");
ethyl dipropylthiocarbamate (common name "EPTC");
S-ethyl diisobutyl (thiocarbamate) (common name "butylate");
S-propyl dipropyl (thiocarbamate) (common name "vernolate");
2,3,3-trichloroallyl-diisopropylthiolcarbamate (common name "triallate")

Examples of important acetamide herbicides are the following:

2-chloro-N-isopropylacetanilide (common name "propachlor");
2-chloro-1',6'-diethyl-N-(methoxymethyl)-acetanilide (common name "alachlor");
2-chloro-2',6'-diethyl-N-(butoxymethyl)-acetanilide (common name "butachlor");
2-chloro-N-(ethoxymethyl)-6'-ethyl-o-acetololuidide (common name "acetochlor");
ethyl ester of N-chloroacetyl-N-(2,6-diethylphenyl)glycine (common name "diethatyl ethyl");
2-chloro-N-(2,6-dimethylphenyl)-N-(2-methoxyethyl)-acetamide (common name "metolachlor");
2-chloro-N-(2-methoxy-1-methylethyl)-6'-ethyl-o-acetotoluidide (common name "metolachlor");
2-chloro-2'-methyl-6'-methoxy-N-(isopropoxymethyl)-acetanilide;

2-chloro-2',6'-dimethyl-N-(1-pyrazol-1-yl-methyl)acetanilide common name "metazachlor");
 2-chloro-N(2,6-dimethyl-1-chlohexen-1-yl)-N-(1H-pyrazol-1-ylmethyl)acetamide;
 2-chloro-6'-trifluoromethyl-N-(isopropoxymethyl)acetanilide;
 2-chloro-2'-methyl-6'-trifluoromethyl-N-(ethoxymethyl)acetanilide;
 2-chloro-2'-ethyl-6'-trifluoromethyl-N-(1-pyrazolyl-1-ylmethyl)acetanilide;
 2-chloro-N-isopropyl-1-(3,5,5-trimethylcyclohexen-1-yl)acetamide (common name "trimexachlor").

Examples of important pyridine herbicides include:

3-pyridinecarboxylic acid, 2-(difluoromethyl)-5-(4,5-dihydro-2-thiazolyl)-4-(2-methylpropyl)-6-(trifluoromethyl)-, methyl ester;
 3-pyridinecarboxylic acid, 2-(difluoromethyl)-4-(2-methylpropyl)-5-(1H-pyrazol-1-ylcarbonyl)-6-(trifluoromethyl)-, methyl ester;
 3,5-pyridine dicarbothioic acid, 2-(difluoromethyl)-4-(2-methylpropyl)-6-(trifluoromethyl)-, S,S-dimethyl ester;
 3,5-pyridine dicarbothioic acid, 2-(difluoromethyl)-4-(2-methylpropyl)-6-trifluoromethyl, dimethyl ester.

Examples of important heterocyclyl phenyl ethers include:

5-(trifluoromethyl)-4-chloro-3-(3'-[1-ethoxycarbonyl]-ethoxy-4'-nitrophenoxy)-1-methylpyrazol;
 5-(trifluoromethyl)-4-chloro-3-(3'-[ethoxy-4'-nitrophenoxy]-1-methylpyrazole;
 5-(trifluoromethyl)-4-chloro-3(3'-[1-butoxycarbonyl]-ethoxy-4'-nitrophenoxy)-4-methylpyrazol;
 5-(trifluoromethyl)-4-chloro-3(3'-methylsulfanylcarbonyl propoxy-1'-nitrophenoxy)-4-methylpyrazol;
 5-(trifluoromethyl)-4-chloro-3-(3'-propoxycarbonylmethyloxime-4'-nitrophenoxy)-1-methylpyrazole;
 (\pm)-2-[4-[[5-(trifluoromethyl)-2-pyridinyl]oxy]phenoxy]propanoic acid (9CI).

Examples of important sulfoylureas include:

Benzenesulfonamide, 2-chloro-N-[[4-methoxy-6-methyl-1, 3, 5-triazin-2-yl) amino]carbonyl];
 Benzoic acid, 2-[[[(4-chloro-6-methoxy-2-pyrimidinyl) amino]carbonyl]amino]sulfonyl]-ethyl ester;
 2-thiophenecarboxylic acid, 3-[[[(4,6-dimethoxy-1,3,5-triazin-2-yl)amino]carbonyl]amino]sulfonyl]-, methyl ester;
 Benzoic acid, 2-[[[(4, 6-dimethyl-2-pyrimidinyl) amino]carbonyl]amino]sulfonyl]methyl ester;
 Benzenesulfonamide, 2-(2-chloroethoxy)-N-[[4-methoxy-6-methyl-1, 3, 5-triazin-2-yl) amino]carbonyl];
 Benzoic acid, 2-[[[(4-methoxy-6-methyl-1,3,5-triazin-2-yl)amino]carbonyl]amino]sulfonyl]-methyl ester;

Examples of important imidazolinone herbicides include:

3-Quinolinecarboxylic acid, 2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1H-imidazol-2-yl]-;
 3-pyridinecarboxylic acid, 2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1H-imidazol-2-yl]-;
 Benzoic Acid, 2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1H-imidazol-2-yl]-4(or 5)-methyl-;
 3-pyridinecarboxylic acid, 5-ethyl-2-[4-methyl-4-(1-methylethyl)-5-oxo-1H-imidazol-2-yl];
 3-pyridinecarboxylic acid, 2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1H-imidazol-2-yl]-5-methyl-, ammonium salt.

Examples of other important herbicides include:

2-Chloro-4-(ethylamino)-6-(isopropylaminio)-sym-triazine;
 4-Amino-6-terbutyl-3-(methylthio)-AS-triazine-5-(4H)one;
 5 Trifluoro-2,6-dinitro-N,N-dipropyl-p-toluidine;
 Benzeneamine, N-(1-ethylpropyl)-3, 4-dimethyl-2,6-dinitro-;
 2-Pyrrolidinone, 3-chloro-4-(chloromethyl)-1-[3-(trifluoromethyl) phenyl], trans-;
 10 3-Isloxazolidinone, 2-[(2-chlorophenyl) methyl]-4, 4-dimethyl-;
 2-Imidazolidinone, 3-[5-(1,1-dimethylethyl)-3-isoxazoly]-4-hydroxy-1-methyl-;
 2-Chloro-4-(1-cyano-1-methylethylamino)-6-ethylamino-1,3,5-triazine;
 15 2-Methoxy-3, 6-dichlorobenzoic acid, dimethylamine salt;
 Methyl 5-(2,4-dichlorophenoxy)-2-nitrobenzoate;
 1'-(Carboethoxy)ethyl 5-[2-chloro-4-(trifluoromethyl) phenoxy]-2-nitrobenzoate;
 20 Ammonium-DL-homoalanin-4-yl (methyl) phosphinate;
 2-(3,4-Dichlorophenyl)-4-methyl-1,2,4-oxadiazolidine-3,5-dione.

The herbicides of particular and preferred interest in compositions with antidotes according to this invention include each of the above-mentioned species from different chemical classes of compounds exemplified as important herbicides, particularly those of current commercial interest and use and those which may be determined of commercial utility.

alachlor,
 acetochlor,
 butachlor,
 metolachlor,
 metazochlor,
 2-chloro-2'-methyl-6'-methoxy-N-(isopropoxymethyl)acetanilide,
 2-chloro-2'-methyl-6'-trifluoromethyl-N-(ethoxymethyl)acetanilide, and
 2-chloro-2',6'-dimethyl-N-(2-methoxyethyl)-acetanilide.

All of the above specifically-named herbicides are known in the art, except the heterocyclyl phenyl ethers which are disclosed and claimed in copending U.S. patent application Ser. No. 07/175,460 assigned to the assignee herein.

Combinations may be made of any one or more of the described antidote compounds with any one or more of the herbicide compounds mentioned herein.

Of particular importance and preference herein, a number of the antidotal compounds of the invention have been found to be especially versatile as "in-can" safeners or antidotes for use with a plurality of herbicides in a plurality of crops. Of special mention here is the use of the antidotes, oxazolidine, 3-(dichloroacetyl)-5-(2-furanyl)-2,2-dimethyl-; oxazolidine, 3-(dichloroacetyl)-5-(3-pyridyl)-2,2--dimethyl- and oxazolidine, 3-(dichloroacetyl)-5-(2-thienyl)-2,2-dimethyl-, to reduce the phytotoxicity of alachlor (active ingredient in LASSO® herbicide) in corn and grain sorghum. The just-named antidotes have similarly been found to be particularly efficacious against acetochlor (active ingredient in HARNESS® herbicide) in corn, sorghum and soybeans. And some of these antidotes, particularly the 5-(2-thienyl)oxazolidine compound, have also exhibited antidotal properties against butachlor

(active ingredient in MACHETE® herbicide) in rice, particularly at higher rates, e.g., 8.96 kg/ha.

It will be recognized by those skilled in the art that all herbicides have varying degrees of phytotoxicity to various plants because of the sensitivity of the plant to the herbicide. Thus, e.g., although certain crops such as corn and soybeans have a high level of tolerance (i.e., low sensitivity) to the phytotoxic effect of alachlor, other crops, e.g., milo (grain sorghum), rice and wheat, have a low level of tolerance (i.e., high sensitivity) to the phytotoxic effects of alachlor. The same type of sensitivity to herbicides as shown by crop plants is also exhibited by weeds, some of which are very sensitive, others very resistant to the phytotoxic effects of the herbicide.

When the sensitivity of a crop plant to a herbicide is low, whereas the sensitivity of a weed to that herbicide is high, the "selectivity factor" of the herbicide for preferentially injuring the weed while not injuring the crop is high.

In an analogous manner, but more complex, an antidotal compound may, and commonly does, have varying degrees of crop protective effect against different herbicides in different crops. Accordingly, as will be appreciated by those skilled in the art, the various antidotes of this invention, as with all classes of antidotal compounds, will have greater or lesser crop safening effects against various herbicides in various crops than in others. Thus, while a given antidotal compound may have no crop protective ability against a given herbicide in a given crop, that same antidotal compound may have a very high crop protective ability against the same given herbicide in a different crop or against a different herbicide in the same crop. This is an expected phenomenon.

DETAILED DESCRIPTION OF THE INVENTION

Antidote Compound Preparation

The antidote compounds of the invention may be prepared by the following exemplary general procedures described in Examples 1-38.

These examples are presented for purposes of illustration only and are not intended as a restriction on the scope of the invention. All parts are by weight unless otherwise indicated.

Table I sets forth analytical data for 38 specific compounds prepared in accordance with these procedures.

EXAMPLE 1

Preparation of 3-(Dichloroacetyl)-2,2-Dimethyl-5-(2-Thienyl)- Oxazolidine

2-Thiophenecarboxaldehyde (28.3 g, 0.252 mol) was added to a mixture of cyanotrimethylsilane (25 g, 0.252 mol) and zinc iodide (1 mg), and the mixture was stirred at room temperature under nitrogen for 2 hours. The resulting silylcyanohydrin was distilled directly from the pot (BP 95° C. @1.5 torr) yielding 50.9 g (96%) of a pale yellow oil.

The silylcyanohydrin (0.241 mol) was taken up in 100 mL of anhydrous ether and was added dropwise to 13.7 g (0.361 mol) of lithium aluminum hydride in 400 mL of anhydrous ether under nitrogen cooled in an ice bath. The green colored reaction was stirred overnight then cooled in an ice bath, and was carefully quenched with 20 mL of water followed by 20 mL of 10% NaOH. After stirring for 30 min. anhydrous sodium sulfate was

added and the mixture was filtered through celite. The filter cake was rinsed with THF and the filtrate was concentrated to give a solid which was recrystallized from methylene chloride—ether to give 25 g (72%) of α -(aminomethyl)-2-thiophenemethanol; MP 80°-82° C.

Twelve grams (12.0 g, 83.8 mmol) of the product in the preceding paragraph and acetone (9.7 g, 0.168 mol) in 85 mL of 1,2-dichloroethane were refluxed for 2 hours using a reverse water separator. Resulting mixture was concentrated giving an oil which was distilled to give 12.33 g (80%) of 2,2-dimethyl-5-(2-thienyl)oxazolidine, as a pale yellow oil (BP 102°-105° C. @1.5 torr).

To a stirred mixture of 4.0 g (21.83 mmol) of the product of the preceding paragraph in a biphasic mixture of 40 mL of methylene chloride (CH₂Cl₂) and 20 mL of 10% NaOH cooled in an ice bath was added 2.5 mL (26.19 mmol) of dichloroacetyl chloride dropwise. The mixture was stirred for 20 min. and the layers separated. The aqueous layer was extracted with CH₂Cl₂ and the combined organic layers dried over anhydrous magnesium sulfate (MgSO₄). The product was purified by chromatography on silica gel (Waters Prep. 500A, 10% ethylacetate-hexanes) and recrystallization from methylcyclohexane to give 3.87 g (60%) of the title compound. MP 104°-105° C.

EXAMPLES 2-5

Following substantially the same procedure described in Example 1, but substituting the appropriate heterocyclic aldehyde, the antidotal compounds of Examples 2-5 were prepared. These compounds are identified by structure and physical properties in Table 1 herein.

EXAMPLE 6

Example 6 is prepared using the same basic procedure as Example 1 with the following modifications. The starting material for Example 1, 2-thiophenecarboxaldehyde, is replaced by 3-furaldehyde. In addition, a benzene reflux is used to azeotrope water rather than 1,2-dichloroethane when forming the oxazolidine ring with acetone. The dichloroacetylation step is effected by placing 11.2 grams (0.067 mol) 2,2-dimethyl-5-(3-furan)-oxazolidine in methylene chloride at 0° C. with 9.5 g (0.094 mol) triethylamine and adding dropwise 11.8 grams (0.08 mol) dichloroacetyl chloride. The reaction mixture is washed with water and the organics dried with MgSO₄. Concentration and chromatography with 10% ethylacetate-hexanes gives 5.1 grams (65%) of white solid; m.p. 90°-91° C.

EXAMPLES 7-12

Following the same procedure described in Example 6, but substituting the appropriate heterocyclic aldehyde, the antidotal compounds of Examples 7-12 were prepared. These compounds are described by structure and physical properties in Table 1 herein.

EXAMPLE 13

Following the procedure described in Example 1, but substituting diethyl ketone for acetone, the compound identified as Example 13 in Table 1 was prepared and characterized.

EXAMPLES 14 and 15

The compounds of Examples 14 and 15 in Table 1 were prepared in accordance with the basic procedure of Example 1 above, substituting 2-furaldehyde and 3-methyl-2-thiophenecarboxaldehyde, respectively, for 2-thiophenecarboxaldehyde and acetaldehyde for acetone, and with the following additional modification in Example 14. In Example 14 the oxazolidine ring is formed by placing 5.0 grams (0.04 mol) 1-furanmethanol alpha-(aminomethyl)- and 1.8 grams (0.04 mol) acetaldehyde in methylene chloride in the presence of MgSO₄ for 2 hours. After filtration and then cooling to 0°C., 4.3 g (0.06 mol) pyridine was added. After the addition of 6.9 grams (0.05 mol) dichloroacetyl chloride the reaction mixture is washed with water and the organics are dried over MgSO₄. Concentration and chromatography with 10% ethyl acetate-hexanes gives 2.0 grams (19%) of colorless oil.

EXAMPLE 16

Following substantially the same procedure as in Example 14, but substituting propionaldehyde instead of acetaldehyde, the product identified as Example 16 in Table 1 was produced.

EXAMPLE 17

In similar manner, when the procedure of Example 14 was repeated using benzaldehyde instead of acetaldehyde, there was obtained the product of Example 17 as identified in Table 1.

EXAMPLE 18 and 19

To prepare antidotal compounds according to the invention having mixed halogen atoms at the 3-haloacyl position, the procedure of Example 6 was repeated, but substituting bromochloroacetyl chloride as the acylating agent instead of dichloroacetyl chloride. In this manner, the compounds identified in Table 1 as Examples 18 and 19 were prepared and characterized.

EXAMPLE 20

Pyridine, 3-[3-(dichloroacetyl)-2,2-dimethyl-5-oxazolidinyl]-.

To a cooled stirring solution of 15 grams (0.25 mol) nitromethane and 0.35 gram (0.005 mol) diethylamine in 26 milliliters of ethanol was added dropwise 10 grams (0.093 mol) 3-pyridine carboxaldehyde. The reaction was stirred for 3 hours at 0° C. then warmed to ambient temperature. Concentration yielded crude 1-(3-pyridyl)-2-nitroethanol.

The above product was dissolved in ethyl alcohol and added to 8 grams of 10% palladium on carbon. The mixture was hydrogenated in a Parr Shaker at 45 psi until 3 mol equivalents of hydrogen were reacted. Filtration through celite and concentration yielded a crude 2-(3-pyridyl)-2-hydroxy-1-aminoethane.

The product of the preceding paragraph and 10.9 grams (0.19 mol) acetone were stirred in 150 milliliters benzene and refluxed for 4 hours in a Dean-Stark apparatus to remove water. The reaction mixture was decanted from any solid and concentrated to a crude pyridine, 3-(2,2-dimethyloxazolidinyl)-.

The oxazolidinyl compound of the preceding step and 10.3 grams (0.102 mol) triethylamine were stirred at 0° C. in CH₂Cl₂. 12.9 grams (0.088 mol) dichloroacetyl chloride were added dropwise and the reaction mixture was stirred for 30 minutes at 0° C. The reaction mixture

was warmed to ambient temperature and stirred for 1 hour. The reaction was worked up by washing with water, separation and drying the organics with Na₂SO₄. Filtration and concentration yielded crude product which when chromatographed with 60% ethylacetate-hexanes gave 7% overall yield of the title compound (1.8 grams, cream colored solid, M.P. 111°-113° C.)

The product of this example can also be prepared according to the procedure of Example 1.

EXAMPLE 21

Three (3) grams (0.01 mol) of the product of Example 20 and 1.1 gram (0.013 mol) of NaHCO₃ were stirred in CH₂Cl₂. To this mixture was added 2.15 grams (0.01 mol) of m-chloroperbenzoic acid in two portions and stirred for one hour. The reaction mixture was washed with water and dried with MgSO₄. The MgSO₄ was filtered and the CH₂Cl₂ was removed to yield a white solid. Flash chromatography using 20% methanol, 30% ethylacetate 50% hexanes was done on the crude product. After concentration and placing under high vacuum for 24 hours at room temperature an amorphous solid was collected. (MP=64°-70° C., 2.5 grams, 82% yield). The product was identified as pyridineoxide, 2-[3-(dichloroacetyl)2,2-dimethyl-5-oxazolidinyl]-.

EXAMPLE 22

Two (2) grams (0.007 mol) of the product of Example 20 were dissolved in CH₂Cl₂ and 1.2 gram (0.007 mol) of methyl trifluoromethyl sulfonate was added dropwise. A colorless solid precipitated after 30 minutes which was filtered and collected under nitrogen. 2.7 grams (86% yield) of product was collected (M.P. 151°-153° C.) and identified as pyridinium, 3-[3-(dichloroacetyl)-2,2-dimethyl-5-oxazolidinyl]-1-methyl-, salt of trifluoromethane sulfonic acid (1:1).

EXAMPLE 23

Caution: This procedure uses HCN which is highly toxic and requires special handling.

19.2 grams (0.2 mol) of freshly distilled 2-furaldehyde and 40 milligrams of mandelonitrile lyase (4.1.2.10) were dissolved in 480 milliliters of 50% methanol-acetate buffer (pH=5.2) 7.1 grams (0.26 mol) of HCN were added over 10 minutes with vigorous stirring to this reaction mixture. The reaction mixture was stirred for 40 minutes at room temperature and then placed under vacuum for 15 minutes to remove excess HCN. Extraction was effected using CHCl₃ (3×150 mls) and then the organics were dried using MgSO₄. After filtration and concentration, 21 grams of 83% enantiomerically pure oil, 2-(1-hydroxy-2-cyanoethyl)-furan (S) was collected. Optical rotation $[\alpha]_D^{21} = +28.5^\circ$ (C=5, chloroform; Lit value $[\alpha]_D^{20} = +30.6^\circ$ C. neat)

Seven (7.0) grams (0.057 mol) of the above product were dissolved in anhydrous ethyl ether and added dropwise to 74 milliliters of 1 M ethyl ether solution of lithium aluminum hydride (LAH) under nitrogen. The reaction mixture was stirred 5 hours and then the excess LAH was destroyed by adding dropwise 5 milliliters of H₂O and 5 milliliters of 10% NaOH (aq). The mixture was filtered and concentrated to give 4 grams of colorless solid (55% yield). Recrystallization from ethyl acetate-hexane yielded 2-(1-hydroxy-2-aminoethyl)-furan (S) with a melting point equal to 74°-77° C. Optical rotation $[\alpha]_D^{21} = -23.6^\circ$ (C=5, chloroform; Lit value $[\alpha]_D^{21} = -28^\circ$ C=5, chloroform)

Two (2.0) grams (0.016 mol) of the product of the preceding paragraph, 1.8 grams (0.031 mol) of acetone and 50 milliliters of benzene were stirred together at reflux for 40 hours in a dean Stark apparatus. After 0.2 milliliters of H₂O was removed, the reaction was cooled and concentrated to collect 2.58 grams (96% yield) of amber oil, 2,2-dimethyl-5-(2-furyl)oxazolidine (S).

2.58 grams (0.015 mol) of the above oxazolidine compound was dissolved in CH₂Cl₂ and cooled to 0° C. at which time 2.18 grams (0.02 mol) of triethylamine was added in one portion with stirring. Dropwise addition of 2.17 grams (0.019 mol) of dichloroacetyl chloride was effected and the reaction was stirred for an additional 30 minutes at 0° C. The reaction was warmed to room temperature, washed with water and the organics were dried with Na₂SO₄. Filtration and concentration yielded 5.0 grams of dark oil which was chromatographed using 10% ethyl acetate-hexane. 2.5 grams of colorless product were collected and identified as oxazolidine, 3-(dichloroacetyl)-5-(2-furanyl)-2,2-dimethyl-, (S); (m.p. = 116°-119° C., yield = 60%). Optical rotation $[\alpha]_D^{21} = +10.8^\circ$ (C = 5, chloroform).

EXAMPLE 24

Six grams (0.05 mol) of 2-(1-hydroxy-1-aminoethyl)-furan, 2.8 grams (0.05 mol) acetic acid and 10.6 grams (0.1 mol) 1,1,1-trifluoromethyl acetone were refluxed in benzene for 1.5 hours while removing water via a Dean-Stark apparatus. The reaction mixture was concentrated and the acetic acid was removed on a Kugelrohr without heating, and then the product was distilled over at 80°-100° C. (high vacuum). 8.4 grams of colorless oil was collected (76% yield) and identified as oxazolidine, 5-(2-furanyl)-2-methyl-2-trifluoromethyl-.

One (1.0) gram (0.005 mol) of the above oxazolidine and 0.7 gram (0.005 mol) dichloroacetyl chloride were refluxed in toluene for 4 hours. The reaction mixture was concentrated and flash chromatography was run with 5% ethyl acetate-hexanes on the crude product. Three-fourth (0.75) gram (45% yield) of white solid, was collected and identified as oxazolidine, 3-(dichloroacetyl)-2-methyl-5-(2-furanyl)-2-(trifluoromethyl)-; m.p. = 97°-100° C. as a mixture of diastereoisomers.

EXAMPLES 25 and 26

Following substantially the same procedure described in Example 24, but substituting 2-(1-hydroxy-1-aminoethyl)-thiophene for the -furanyl analog, 3.3 g (5.6% yield) of white solid was separated and identified as an isomeric mixture of cis- and trans- oxazolidine, 3(dichloroacetyl)-2-methyl-5-(2-thienyl)-2-(trifluoromethyl)-. The diastereoisomers were separated by chromatography using 10% ethylacetate and hexanes. The isomeric compounds were recovered in a ratio of 2:1 (trans:-cis-). MP of the trans-isomer, 89°-90° C. and of the cis-isomer, 96°-97° C. The structures of these isomers were tentatively assigned by NMR and molecular modeling.

EXAMPLE 27

This example describes the preparation of an antidotal compound according to the invention wherein the R₅ and R₆ members of the above generic formula are combined with the 5-carbon atom of the oxazolidine ring to form a six-membered spiroheterocyclic radical.

The process of Example 6 was repeated, except the 3-furaldehyde of that example was replaced by tetrahy-

drothiopyran-4-one as the starting heterocyclic radical donor. After reaction and workup as described in Example 6, there was recovered 4.5 g (56% yield) of a white-colored solid MP 137°-139° C., which was identified as 1-oxa-8-thia-3-azaspiro [4.5]-decane, 3-(dichloroacetyl)-2,2-dimethyl-.

EXAMPLE 28

This example describes the preparation of an antidotal compound wherein the R₅ and R₆ members of the above generic formula are combined with the 5-carbon atom of the oxazolidinyl ring to form a 5-membered spiroheterocyclic radical.

The process according to Example 6 was repeated, except the 3-furaldehyde of that example was replaced by tetrahydrothiophene-3-one as the heterocyclic radical donor starting material. After reaction and workup as described in Example 6, 5.5 g (65% yield) of a white-colored solid MP 128°-130° C., was recovered. The compound was identified as 1-oxa-7-thia-3-azaspiro [4.4]-nonane, 3-(dichloroacetyl)-2,2-dimethyl-.

EXAMPLE 29

The process of Example 14 was repeated, except in this example, the starting material of Example 14 was replaced by tetrahydrothiopyran-4-one. After reaction and workup, 5.0 g (65% yield) of a white-colored solid, MP 109°-111° C. was recovered. The compound was identified as 1-oxa-8-thia-3-azaspiro [4.5]-decane, 3-(dichloroacetyl)-2-methyl-.

EXAMPLE 30

The process of Example 14 was followed, except the starting material of Example 14 was replaced by tetrahydrothiophene and the acetaldehyde was replaced by propionaldehyde. After workup, 5.8 g (53% yield) of a colorless oil was recovered. The compound was identified as 1-oxa-7-thia-3-azaspiro [4.4]-nonane, 3-(dichloroacetyl)-2-ethyl-.

EXAMPLE 31

This example describes the preparation of an antidotal compound according to the invention, characterized by an alkyl substitution in the 4-position and by a 5-furanyl substitution.

The process of Example 20 was again repeated, except in this process 2-furaldehyde was used in place of the 3-pyridinecarboxaldehyde of Example 20 and nitroethane was used instead of nitromethane in the first step of the action.

After workup, 0.4 g (3% yield) of a white-colored solid, MP 128°-131° C. was recovered. The compound was identified as oxazolidine, 3-(3-dichloroacetyl)-5-(2-furanyl)-2,2,4-trimethyl-.

EXAMPLE 32

Another antidotal compound exemplary of those of this invention is characterized by substitution of a pyrazinyl radical in the 5-position of the oxazolidine ring.

The process of this example followed that of Example 20, but for the substitution of 2-pyrazinecarboxaldehyde for the 3-pyridinecarboxaldehyde of Example 20.

After reaction and workup, 0.9 g (5% yield) of a tan-colored solid, MP 94°-96° C. was recovered. The product was identified as pyrazine, 3-[3-(dichloroacetyl)-2,2-dimethyl-5-oxazolidinyl].

EXAMPLE 33

To a solution of 9.2 mL (0.105 mol) of oxalyl chloride in 200 mL of anhydrous methylene chloride under nitrogen at -78°C . was added 7.8 mL (0.11 mol) of anhydrous dimethylsulfoxide dropwise over several minutes. Following the addition the mixture was allowed to warm to -35°C . and after five minutes was recooled to -78°C . A solution of 10.2 g (0.10 mol) of tetrahydrofurfural alcohol in 100 mL of anhydrous methylene chloride was added. The reaction was warmed to -35°C . then 70 mL (0.50 mol) of triethylamine was added over a five minute period. The reaction was recooled to -78°C . and was stirred at that temperature for two hours. The mixture was then filtered followed by washing the filtrate with 350 mL of 5% hydrochloric acid. The aqueous layers were back-washed with two portions of methylene chloride. The combined organic phases were dried over anhydrous magnesium sulfate and concentrated ($>10^{\circ}\text{C}$., 100 torr) to ca. 20 mL volume to give a mixture of the desired aldehyde and methylene chloride. This mixture is treated with 13.3 mL (0.10 mol) of trimethylsilylcyanide and 10 mg of zinc iodide. The mildly exothermic reaction is stirred under nitrogen at room temperature for one hour followed by concentration in vacuo. The resulting oily silyl cyanohydrin was taken up in 150 mL of anhydrous ether. Cooled mixture in an ice bath under nitrogen followed by the addition of 100 mL of a 1 M lithium aluminum hydride solution in ether. The reaction is mechanically stirred at room temperature for two hours and is then recooled with an ice bath followed by the cautious dropwise addition of 3 mL of water then 6 mL of a 10% sodium hydroxide solution. Diluted mixture with 200 mL of tetrahydrofuran and stirred at room temperature for 45 minutes. Anhydrous sodium sulfate was added to absorb excess water followed by filtration through celite and concentration in vacuo to give the amino alcohol as an amber oil. The amino alcohol was dissolved in 100 mL of acetone. About 5 g of anhydrous magnesium sulfate was added followed by stirring overnight at room temperature. Filtration and concentration in vacuo gave the oxazolidine as an amber oil. The oxazolidine was dissolved in 150 mL of methylene chloride followed by the addition of 75 mL of 10% sodium hydroxide. The mixture was cooled in an ice bath and was treated with 9.6 mL (0.10 mol) of dichloroacetyl chloride. The reaction was vigorously stirred for 45 minutes. The layers were then separated and the organic phase was dried over anhydrous magnesium sulfate. Thin layer chromatography (ethyl acetate:hexanes=1,1) and gas chromatography show the presence of the title product as a mixture of two diastereomers. The mixture was resolved by flash chromatography on silica gel (ethyl acetate:hexanes 1:4). The two diastereomers were isolated: (A) 3.46 g of the less polar isomer was isolated as a yellow oil $n_D^{25}=1.4991$. Anal. calc'd for $\text{C}_{11}\text{H}_{17}\text{Cl}_2\text{NO}_3$: C,46.82; H,6.07; Cl, 25.13. Found: C,46.52; H,6.01; Cl,25.01. (B) 2.00 g of the more polar isomer as a yellow oil $n_D^{25}=1.5021$. Anal. Calc'd for $\text{C}_{11}\text{H}_{17}\text{Cl}_2\text{NO}_3$: C,46.82; H,6.07; Cl,25.13. Found: C,46.58; H,6.00; Cl,24.97. The overall yield for the six steps is 19%. The product was identified as 3-(dichloroacetyl)-2,2-dimethyl-5-(tetrahydro-2-furanyl)-oxazolidine.

EXAMPLE 34

Using the same basic procedure described in Example 6, but substituting monochloroacetyl chloride in the last step, the compound oxazolidine, 3-(chloroacetyl)-5-(2-furanyl)-2, 2-dimethyl was prepared.

EXAMPLE 35

Following the procedure of Example 6, but substituting trichloroacetyl chloride in the last step of the reaction there was prepared oxazolidine, 5-(2-furanyl)-2,2-dimethyl-3-(trichloroacetyl)-.

EXAMPLE 36

Using the same procedure as Example 6, but substituting 2-thiophene-methanol for tetrahydrofurfuralalcohol and using monofluoroacetyl chloride in the last step, the compound oxazolidine, 3-(fluoroacetyl) 2,2-dimethyl-5-(2-thienyl) was prepared. MP 65°C - 67°C .

EXAMPLE 37

The compound oxazolidine, 3-(dichloroacetyl)-5-(2-thienyl)- was prepared using the same basic procedure as Example 6 with the following modifications: the cyclization of the 2-thiophenemethanol, alpha-(aminomethyl)-, with formaldehyde to form the oxazolidine ring was effected by dissolving the 2-thiophenemethanol, alpha-(aminomethyl)-, in water and then adding the formaldehyde in one portion. The resulting oil that drops out is extracted with methylene chloride and dried with anhydrous magnesium sulfate (MgSO_4). Filtration and concentration gave a crude product which was acetylated with dichloroacetyl chloride to give the above compound.

EXAMPLE 38

The same basic procedure as in example 6 was repeated with the following modifications: the cyclization of the 2-benzofuranmethanol, alpha-(aminomethyl)-, with acetone was effected by stirring the two together at ambient temperature until a homogeneous solution resulted. After which the solution was dried with anhydrous magnesium sulfate (MgSO_4). Filtration and concentration gave a crude product that was acetylated to yield oxazolidine, 5-(2-benzofuranyl)-3-(dichloroacetyl)-2, 2-dimethyl- MP 115°C - 117°C .

Various other compounds with the above generic formula and analogs thereof are specifically contemplated as within the scope of the invention. For example, compounds according to the above formula where the oxygen atom of the oxazolidinyl radical is replaced by a sulfur atom (to form the thiazolidinyl analog) and the $\text{R}-\text{R}_6$ members are as defined above may be found to have varying degrees of antidotal activity against various herbicides in various crops. Particularly contemplated are such thiazolidinyl compounds wherein R is dichloromethyl, the R_1-R_5 members hydrogen or C_{14} alkyl and the R_6 member is a thienyl, furanyl, pyranyl, pyrazinyl or pyridinyl radical or the 5,5-spiro analogs thereof. Exemplary species include thiazolidine, 3-(dichloroacetyl)-5-(2-furanyl)-2,2-dimethyl-; thiazolidine, 3-(dichloroacetyl)-5-(2-thienyl)-2,2-dimethyl-; thiazolidine, 3-(dichloroacetyl)-2,2-dimethyl 5-(1-methyl-1H-pyrrol-2-yl)-; thiazolidinyl, 3-(dichloroacetyl)-5-(3-pyridyl)-2,2-dimethyl- and thiazolidinyl, 3-(dichloroacetyl)-5-(2-pyrazyl)-2,2-dimethyl-. As with the oxazolidinyl analogs, the foregoing thiazolidinyl compounds and analogs thereof may be characterized as having H or other lower alkyl groups in the R_1-R_5 positions.

The antidotal compounds prepared in accordance with the foregoing working examples are listed in Table 1. The specific compounds are listed in the first column by example/antidote number ("Ex./Antidote No.") followed by structural features according to the generic formula at the head of the table and by process yield and physical characteristics in the remaining columns.

TABLE I

Ex./Antidote No.	R	R ₁	R ₂	R ₃	R ₄	R ₅	R ₆	Yield (Wt. %)	MP (°C.)	Elem.	Anal.	
											Cal'd.	F'nd
1	--CHCl ₂	--CH ₃	--CH ₃	H	H	H		60	104-105	C H Cl	44.91 4.45 24.10	45.02 4.49 24.04
2	--CHCl ₂	--CH ₃	--CH ₃	H	H	H		26	91-93	C H Cl	46.76 4.91 23.00	46.85 4.96 22.95
3	--CHCl ₂	--CH ₃	--CH ₃	H	H	H		50	95-96	C H Cl	47.50 4.71 25.49	47.64 4.72 25.42
4	--CHCl ₂	--CH ₃	--CH ₃	H	H	H		47	94-96	C H Cl	46.76 4.91 23.00	46.81 4.95 22.92
5	--CHCl ₂	--CH ₃	--CH ₃	H	H	H		47	84-87	C H Cl	44.91 4.45 24.10	44.98 4.46 24.01
6	--CHCl ₂	--CH ₃	--CH ₃	H	H	H		65	90-91	C H Cl	47.50 4.71 25.49	46.42 4.64 24.55
7	--CHCl ₂	--CH ₃	--CH ₃	H	H	H		77	82-84	C H N	46.76 4.91 4.54	46.82 5.02 4.46
8	--CHCl ₂	--CH ₃	--CH ₃	H	H	H		71	78-80	C H N	49.33 5.18 4.79	49.43 5.26 4.71

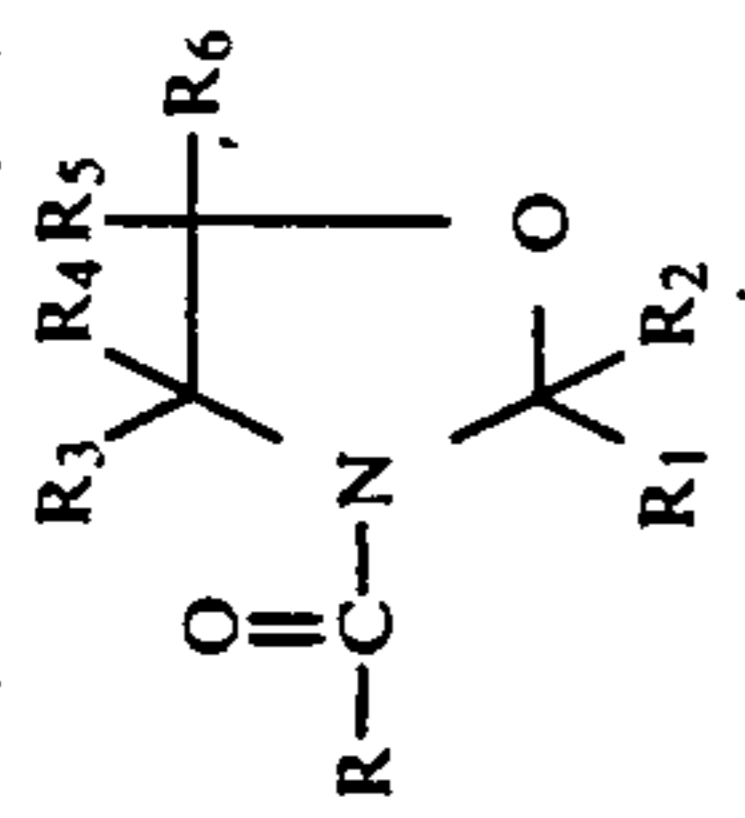


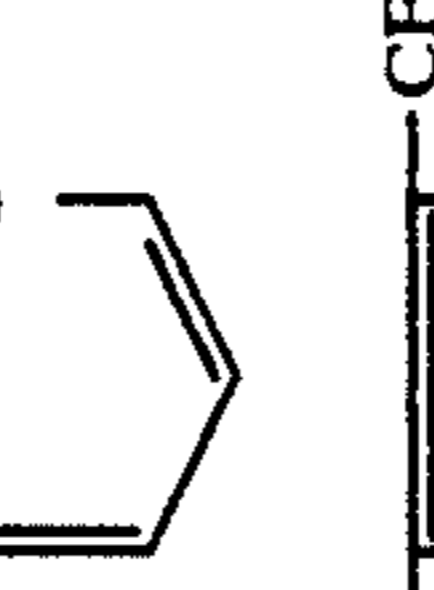

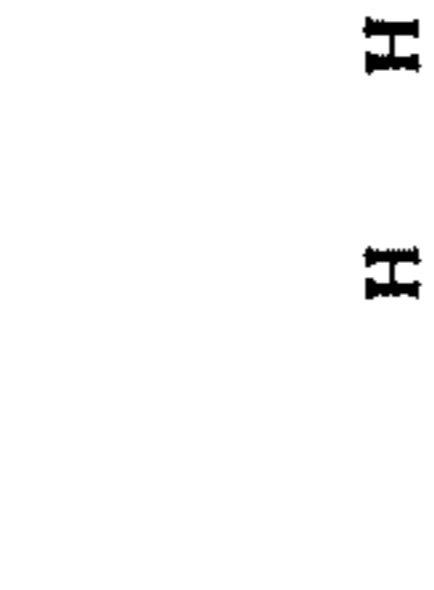

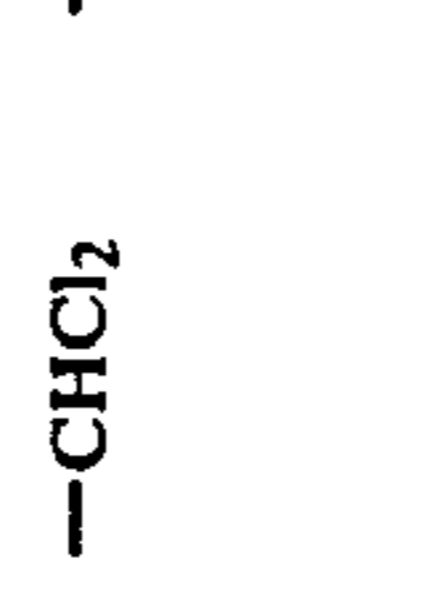



TABLE 1-continued

Ex./Antidote No.	R	R ₁	R ₂	R ₃	R ₄	R ₅	R ₆	Yield (Wt. %)	MP (°C.)	Elem.	Anal.	
											Cal'd.	F'nd
9	—CHCl ₂	—CH ₃	—CH ₃	H	H	H		53	100-102	C H N	52.50 5.32 9.24	51.55 5.35 9.20
10	—CHCl ₂	—CH ₃	—CH ₃	H	H	H		57	107-108	C H N	49.50 5.54 9.62	39.32 5.60 9.59
11	—CHCl ₂	—CH ₃	—CH ₃	H	H	—CH ₂ CH ₃		9	65-68	C H N	48.45 5.32 4.35	48.53 5.38 4.31
12	—CHCl ₂	—CH ₃	—CH ₃	H	H	H		9	115-116	C H N	33.23 2.53 7.05	33.21 2.57 7.04
13	—CHCl ₂	—CH ₂ CH ₃	—CH ₂ CH ₃	H	H	H		39	80-82	C H Cl	48.45 5.32 22.00	48.52 5.35 21.92
14	—CHCl ₂	—CH ₃	H	H	H	H		19	N _D ²⁶ 1.5300	C H N	45.48 4.20 5.30	45.10 4.29 5.20
15	—CHCl ₂	—CH ₃	H	H	H	H		63	N _D ²⁶ 1.5530	C H N	44.91 4.45 4.76	45.18 4.51 4.84
16	—CHCl ₂	—C ₂ H ₅	H	H	H	H		32	N _D ²⁴ 1.5160	C H N	47.50 4.71 5.04	47.41 4.69 4.87

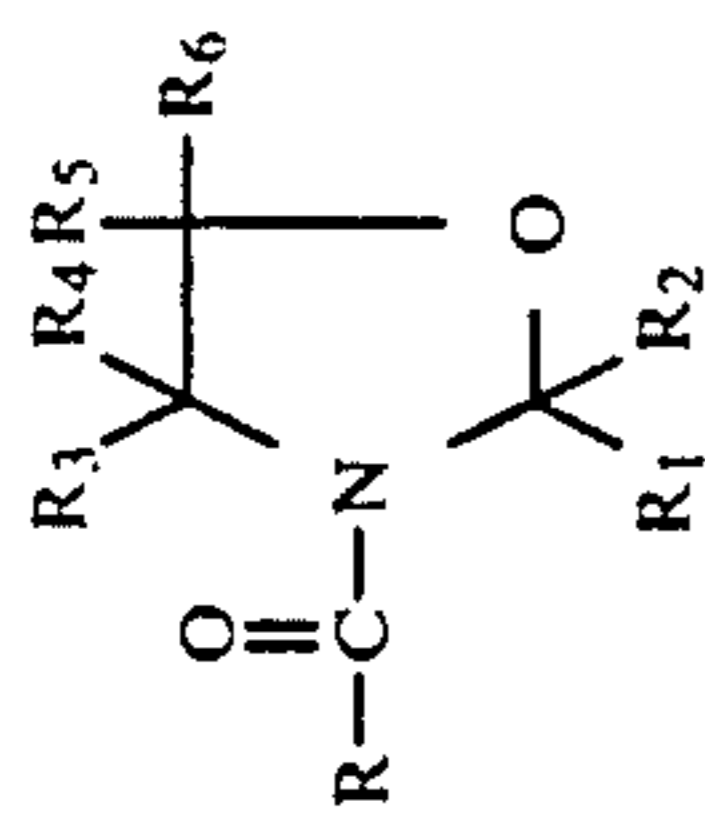


TABLE 1-continued

Ex./Antidote No.	R	R ₁	R ₂	R ₃	R ₄	R ₅	R ₆	Yield (Wt. %)	MP (°C.)	Elem.	Anal.	
											Cal'd.	F'nd
17	-CHCl ₂	-φ	H	H	H	H		32	126-128.5	C H N	55.24 4.02 4.29	55.31 4.06 4.30
18	-CHBrCl	-CH ₃	-CH ₃	H	H	H		45	102-103	C H N	40.96 4.06 4.34	41.13 4.11 4.37
19	-CHBrCl	-CH ₃	-CH ₃	H	H	H		42	101-102.5	C H N	39.01 3.87 4.14	39.11 3.89 4.11
20	-CHCl ₂	-CH ₃	-CH ₃	H	H	H		11	111-112	C H N	49.84 4.88 9.69	49.92 4.90 9.68
21	-CHCl ₂	-CH ₃	-CH ₃	H	H	H		82	64-70	C H N	47.23 4.62 9.18	46.49 4.84 8.69
22	-CHCl ₂	-CH ₃	-CH ₃	H	H	H		86	151-153	C H N	37.10 3.78 6.18	37.19 3.82 6.14

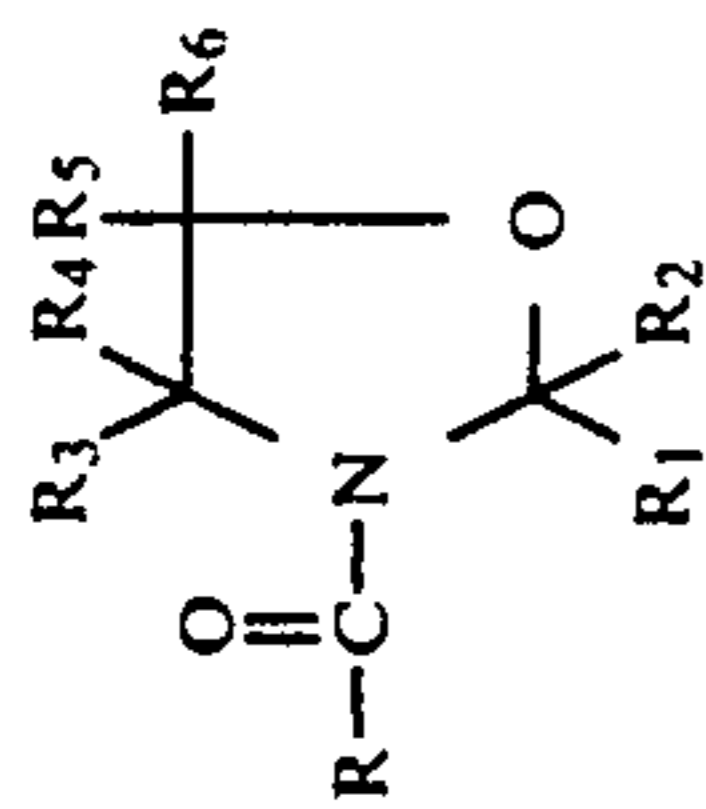


TABLE 1-continued

Ex./Antidote No.	R	R ₁	R ₂	R ₃	R ₄	R ₅	R ₆	Yield (Wt. %)	MP (°C.)	Elem.	Anal.	
											Cal'd.	F'nd
23	--CHCl ₂	--CH ₃	--CH ₃	H	H	H		60	116-119	C H N	47.50 4.71 5.04	47.51 4.74 5.00
24	--CHCl ₂	--CF ₃	--CH ₃	H	H	H		45	97-100	C H N	39.78 3.04 4.22	39.94 3.07 4.27
25	--CHCl ₂	...CF ₃	CH ₃	H	H	H		37	89-90	C H N	37.95 2.90 4.02	38.01 2.91 4.02
26	--CHCl ₂	CF ₃	...CH ₃	H	H	H		19	96-97	C H N	37.95 2.90 4.02	38.00 2.92 4.01
27	--CHCl ₂	--CH ₃	--CH ₃	H	H	H		56	137-139	C H N	44.30 5.75 4.70	44.48 5.73 4.69
28	--CHCl ₂	--CH ₃	--CH ₃	H	H	H		65	128-130	C H N	42.26 5.32 4.93	42.54 5.27 4.86
29	--CHCl ₂	--CH ₃	H	H	H	H		65	109-111	C H N	42.26 5.32 4.93	42.55 5.47 4.91
30	--CHCl ₂	--C ₂ H ₅	H	H	H	H		53	N _D ²⁶ 1.5406	C H N	42.26 5.32 4.93	42.58 5.21 4.82

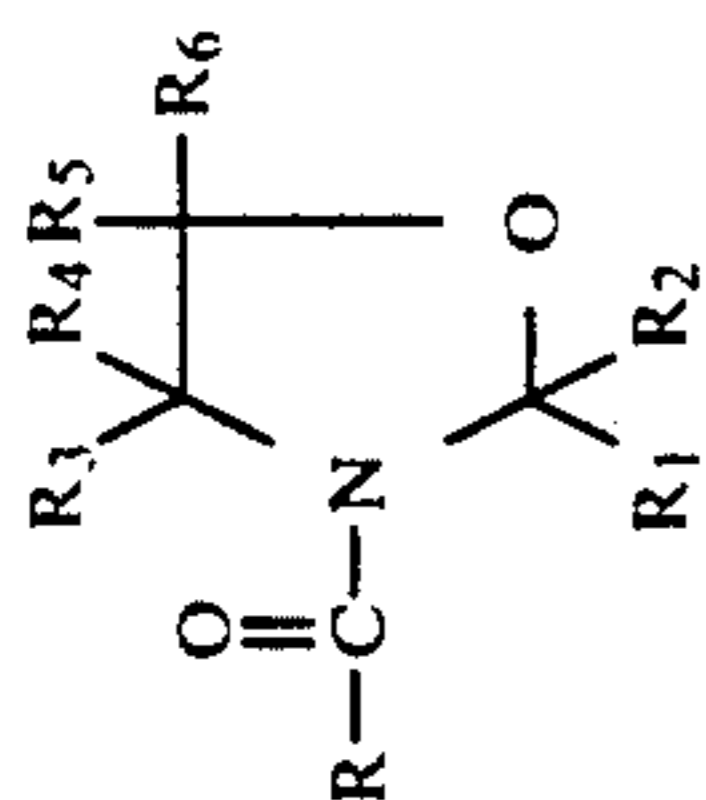


TABLE I-continued

Ex./Antidote No.	R	R ₁	R ₂	R ₃	R ₄	R ₅	R ₆	Yield (Wt. %)	MP (°C.)	Elem.	Anal.	
											Cal'd.	F'nd
31	-CHCl ₂	-CH ₃	-CH ₃	H	-CH ₃	H		3	128-131	C H N	49.33 4.19 4.79	49.35 5.19 4.77
32	-CHCl ₂	-CH ₃	-CH ₃	H	H	H		5	94-96	C H N	45.53 4.53 14.49	44.95 4.47 14.30
33(A)	-CHCl ₂	-CH ₃	-CH ₃	H	H	H		19	Yellow Oil N _D ²⁵ 1.4991	C H Cl	46.82 6.07 25.13	46.52 6.01 25.01
33(B)	-CHCl ₂	-CH ₃	-CH ₃	H	H	H				C H Cl	46.82 6.07 25.12	46.58 6.00 24.97
34	-CH ₂ Cl	-CH ₃	-CH ₃	H	H	H		73	67-69	C H N	54.22 5.79 5.75	54.10 5.85 5.69
35	-CCl ₃	-CH ₃	-CH ₃	H	H	H		70	90-92	C H N	42.27 3.87 4.48	42.32 3.88 4.43
36	-CH ₂ F	-CH ₃	-CH ₃	H	H	H		88	65-67	C H N	54.30 5.80 5.76	54.16 5.83 5.74
37	-CHCl ₂	H	H	H	H	H		8	N _D ²⁰ 1.5790	C H N	40.62 3.41 5.26	40.66 3.43 5.22

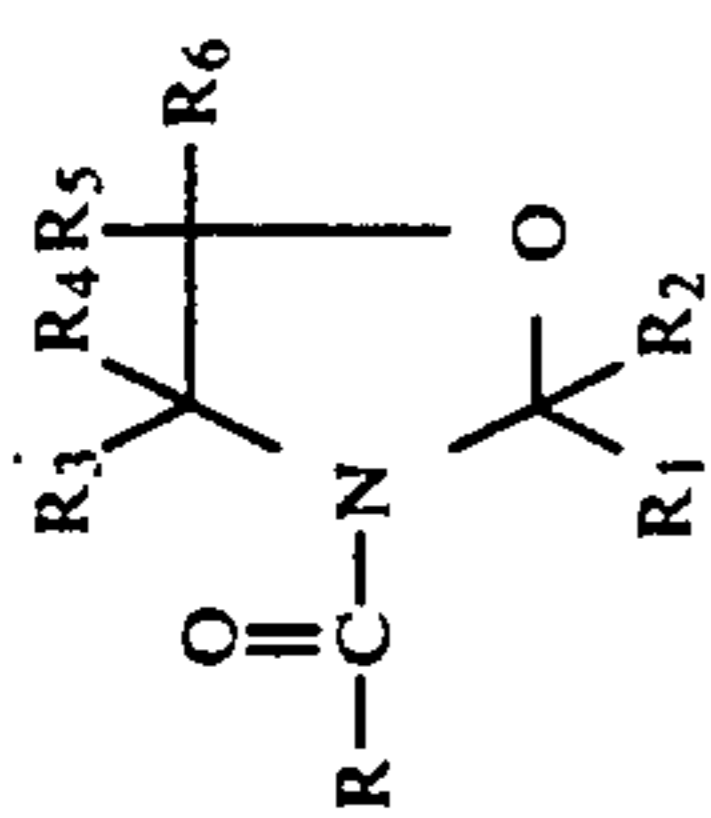
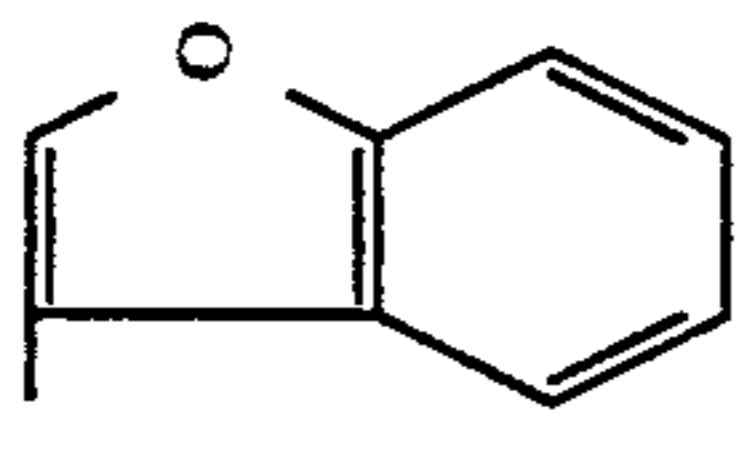
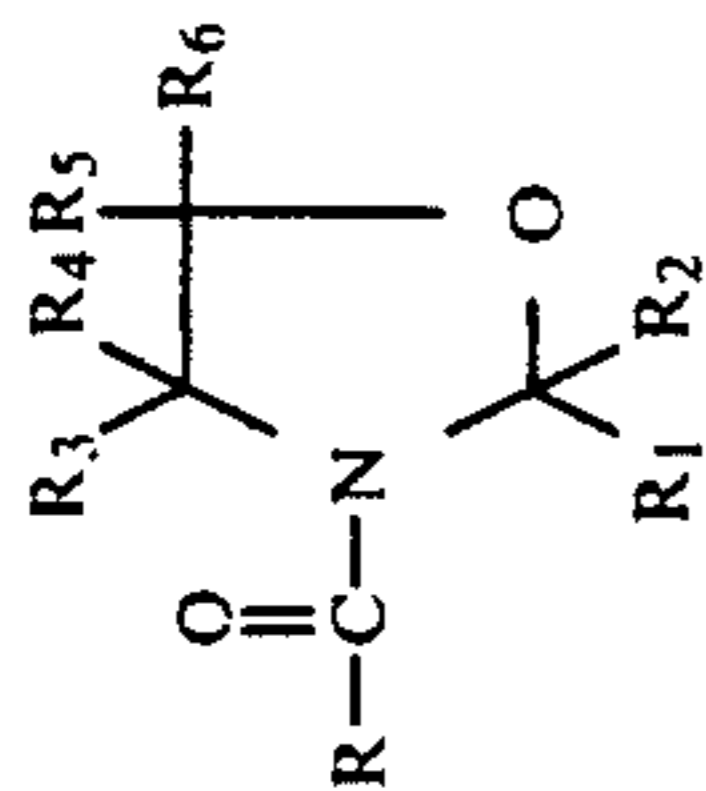


TABLE I-continued

Ex./Antidote No.	R	R ₁	R ₂	R ₃	R ₄	R ₅	R ₆	Yield (Wt. %)	MP (°C.)	Elem.	Anal.	
											Cal'd.	Found
38	-CHCl ₂	-CH ₃	-CH ₃	H	H	H		38	115-117	C	54.90	54.98
										H	4.61	4.62
										N	4.27	4.26



BIOLOGICAL EVALUATION

Effective weed control coupled with low crop injury is a result of treatment of a plant locus with a combination of herbicide compound and antidote compound. By application to the "plant locus" is meant application to the plant growing medium, such as soil, as well as to the seeds, emerging seedlings, roots, stems, leaves, or other plant parts.

The phrase "combination of herbicide compound and antidote compound" embraces various methods of treatment. For example, the soil of a plant locus may be treated with a "tank-mix" composition containing a mixture of the herbicide and the antidote which is "in combination". Or, the soil may be treated with the herbicide and antidote compounds separately so that the "combination" is made on, or in, the soil. After such treatments of the soil with a mixture of herbicide and antidote or by separate or sequential application of the herbicide and antidote to the soil, the herbicide and antidote may be mixed into or incorporated into the soil either by mechanical mixing of the soil with implements or by "watering in" by rainfall or irrigation. The soil of a plant locus may also be treated with antidote by application of the antidote in a dispersible-concentrate form such as a granule. The granule may be applied to a furrow which is prepared for receipt of the crop seed and the herbicide may be applied to the plant locus either before or after in-furrow placement of the antidote-containing granule so that the herbicide and antidote form a "combination". Crop seed may be treated or coated with the antidote compound either while the crop seed is in-furrow just after seeding or, more commonly, the crop seed may be treated or coated with antidote prior to seeding into a furrow. The herbicide may be applied to the soil plant locus before or after seeding and a "combination" is made when both herbicide and antidote-coated seed are in the soil. Also contemplated as a "combination" is a commercially-convenient association or presentation or presentation of herbicide and antidote. For example, the herbicide and antidote components in concentrated form may be contained in separate containers, but such container may be presented for sale or sold together as a "combination". Or, the herbicide and antidote components in concentrated form may be in a mixture in a single container as a "combination". Either such "combination" may be diluted or mixed with adjuvants suitable for soil applications. Another example of a commercially-presented combination is a container of antidote-coated crop seed sold, or presented for sale, along with a container of herbicide material. These containers may, or may not, be physically attached to each other, but nonetheless constitute a "combination of herbicide and antidote" when intended for use ultimately in the same plant locus.

In the foregoing description of various modes of application of the herbicide-antidote combinations, it is inherent that each form of application requires that in some manner, the herbicide and antidote will physically combine to form a "composition" of those agents.

The amount of antidote employed in the methods and compositions of the invention will vary depending upon the particular herbicide with which the antidote is employed, the rate of application of the herbicide, the particular crop to be protected, and the manner of application to the plant locus. In each instance the amount of antidote employed is a safening-effective amount, that

is, the amount which reduces, or protects against, crop injury that otherwise would result from the presence of the herbicide. The amount of antidote employed will be less than an amount that will substantially injure the crop plant.

The antidote can be applied to the crop plant locus in a mixture with the selected herbicide. For example, where the crop seed is first planted, a suitable mixture of antidote and herbicide, whether in a homogeneous liquid, emulsion, suspension or solid form, can be applied to the surface of, or incorporated in, the soil in which the seed has been planted. Or, the herbicide-antidote mixture may be applied to the soil, and the seed thereafter "drilled" into the soil below the soil layer containing the herbicide-antidote mixture. The herbicide will reduce or eliminate the presence of undesirable weed plants. Where the herbicide would by itself injure the crop seedlings, the presence of the antidote will reduce or eliminate the injury to the crop seed caused by the herbicide. It is not essential that the application of herbicide and the antidote to the plant locus be made using the selected herbicide and antidote in the form of a mixture or composition. The herbicide and the antidote may be applied to the plant locus in a sequential manner. For example, the antidote may be first applied to the plant locus and thereafter the herbicide is applied. Or, the herbicide may be first applied to the plant locus and thereafter the herbicide is applied.

The ratio of herbicide to antidote may vary depending upon the crop to be protected, weed to be inhibited, herbicide used, etc., but normally a herbicide-to-antidote ratio ranging from 1:25-to-60:1 (preferably 1:5-to-30:1) parts by weight may be employed. As indicated above, the antidote may be applied to the plant locus in a mixture, i.e., a mixture of a herbicidally-effective amount of herbicide and a safening-effective amount of an antidote, or sequentially, i.e., the plant locus may be treated with an effective amount of the herbicide followed by a treatment with the antidote or vice versa. In general, effective herbicidal amounts are in the range of about 0.1 to about 12 kilograms/hectare. The preferred range of rate of application is from about 0.4 to about 10 kg/ha. Preferably, antidote application rates range from about 0.5 kg/ha down to about 0.05 kg/ha. It will be appreciated that at times amounts either below or above these ranges will be necessary to obtain the best results. The selection of the herbicide to inhibit the emergence and growth of weeds depends upon the species of weeds to be controlled and the crop to be protected.

The application of the antidote can be made directly to the seed before planting. In this practice, a quantity of crop seed is first coated with the antidote. The coated seed is thereafter planted. The herbicide may be applied to the soil before or after the coated seed is planted.

Evaluations of safening activity of the antidote compounds of this invention were carried out using the specific procedures of Examples 39-42 in greenhouse testing. Measurements of biological response as reported in Tables 2-5 were made in the following manner. A visual comparison was made between a crop plant treated with herbicide along and crop plant having no herbicide or antidote treatment. A number was assigned to this visual comparison indicating the percent injury or inhibition to the herbicide-alone treated crop plant (column "WO" in Tables 2-5 indicating herbicide "without" antidote). Also, a visual comparison was made between the crop plant treated with her-

TABLE 2-continued

HERB.	% PLANT INHIBITION AND % SAFENING EFFECT ()											
	ANTIDOTE		Sorghum		Wheat		Rice		Soybean		Corn	
	NO.	RATE	NO.	RATE	W	WO	W	WO	W	WO	W	WO
2	2.24	13	.28	35	100	50	85					
					(65)		(41)					
2	2.24	6	.28	35	95	90	95					
					(63)		(5)					
2	2.24	27	.28	45	95							
					(52)							
2	2.24	7	.28	35	95							
					(63)							
2	2.24	28	.28	25	95							
					(73)							
2	2.24	8	.28	10	95							
					(89)							
2	2.24	29	.28	30	100							
					(70)							
2	2.24	14	.28	20	100							
					(80)							
2	2.24	30	.28	60	100							
					(40)							
2	2.24	15	.28	30	100							
					(70)							
2	2.24	16	.28	25	100							
					(75)							
2	2.24	9	.28	40	100							
					(60)							
2	2.24	10	.28	15	100							
					(85)							
2	2.24	11	.28	15	85							
					(82)							
2	2.24	17	.28	20	90							
					(77)							
2	2.24	20	.28	15	90							
					(83)							
2	2.24	12	.28	50	95							
					(47)							
2	2.24	18	.28	35	97							
					(63)							
2	2.24	24	.28	50	98							
					(48)							
2	2.24	19	.28	35	98							
					(64)							
2	2.24	22	.28	95	92							
					(0)							
3	4.48	1	.28			0	80					
							(100)					
3	4.48	2	.28			50	95					
							(47)					
3	4.48	3	.28				85	95				
							(10)					
3	4.48	4	.28				70	95				
							(26)					
3	4.48	5	.28				90	95				
							(5)					
3	4.48	13	.28				55	85				
							(35)					
3	4.48	6	.28				90	95				
							(5)					
4	2.24	1	.28				30	40	5	95		
							(25)			(94)		
4	2.24	2	.28				30	70	10	95		
							(57)			(89)		
4	2.24	3	.28				95	90	5	95		
							(0)			(94)		
4	2.24	4	.28				70	80	15	80		
							(12)			(81)		
4	2.24	5	.28				80	55	45	85		
							(0)			(47)		
4	2.24	13	.28				40	55	35	90		
							(27)			(61)		
4	2.24	6	.28				80	75	5	95		
							(0)			(94)		
5	.07	1	.28			95	100	90	100			
							(5)		(10)			
5	.14	1	.28				65	50	100	100		
							(0)			(0)		
5	.07	2	.28			100	100	90	95			
							(0)		(5)			
5	.14	2	.28				55	55	85	95		
							(0)			(10)		

TABLE 2-continued

HERB. NO.	RATE	% PLANT INHIBITION AND % SAFENING EFFECT ()		Sorghum		Wheat		Rice		Soybean		Corn	
		ANTIDOTE NO.	RATE	W	WO	W	WO	W	WO	W	WO	W	WO
5	.07	3	.28			50	90	95	95				
						(44)		(0)					
5	.14	3	.28							40	75	95	95
										(46)		(0)	
5	.07	4	.28			90	65	95	95				
						(0)		(0)					
5	.14	4	.28							70	60	95	95
										(0)		(0)	
5	.07	5	.28			95	80	95	90				
						(0)		(0)					
5	.14	5	.28							65	60	95	85
										(0)		(0)	
5	.07	13	.28			85	80	35	85				
						(0)		(58)					
5	.14	13	.28							45	45	55	90
										(0)		(38)	
5	.07	6	.28			90	95	95	95				
						(5)		(0)					
5	.14	6	.28							75	90	95	95
										(16)		(0)	
5	.07	27	.28			95	100	75	90				
						(5)		(16)					
5	.14	27	.28							60	50	95	95
										(0)		(0)	
5	.07	7	.28			95	100	95	90				
						(5)		(0)					
5	.14	7	.28							65	50	95	95
										(0)		(0)	
5	.07	28	.28			100	100	95	90				
						(0)		(0)					
5	.14	28	.28							20	50	95	95
										(60)		(0)	
5	.07	8	.28			100	95	95	90				
						(0)		(0)					
5	.14	8	.28							60	80	90	95
										(25)		(5)	
5	.07	29	.28			100	95	95	95				
						(0)		(0)					
5	.14	29	.28							85	85	95	95
										(0)		(0)	
5	.07	14	.28			90	95	95	95				
						(5)		(0)					
5	.14	14	.28							65	75	95	95
										(13)		(0)	
5	.07	30	.28			95	95	95	95				
						(0)		(0)					
5	.14	30	.28							40	75	95	95
										(46)		(0)	
5	.07	15	.28			100	95	95	95				
						(0)		(0)					
5	.14	15	.28							75	75	95	95
										(0)		(0)	
5	.07	16	.28			100	95	95	95				
						(0)		(0)					
5	.14	16	.28							70	85	95	95
										(17)		(0)	
5	.07	9	.28			100	100	95	95				
						(0)		(0)					
5	.14	9	.28							65	70	95	95
										(7)		(0)	
5	.07	10	.28			95	100	85	95				
						(5)		(10)					
5	.14	10	.28							55	50	75	95
										(0)		(21)	
5	.07	11	.28			100	95	30	95				
						(0)		(68)					
5	.14	11	.28							30	50	95	85
										(40)		(0)	
5	.07	17	.28			100	100	70	100				
						(0)		(30)					
5	.14	17	.28							25	70	85	90
										(64)		(5)	
5	.07	20	.28			100	100	90	100				
						(0)		(10)					
5	.14	20	.28							65	70	100	90
										(7)		(0)	
5	.07	12	.28			95	95	65	95				
						(0)		(31)					

TABLE 2-continued

HERB.		ANTIDOTE		% PLANT INHIBITION AND % SAFENING EFFECT ()									
NO.	RATE	NO.	RATE	Sorghum		Wheat		Rice		Soybean		Corn	
				W	WO	W	WO	W	WO	W	WO	W	WO
5	.14	12	.28							15	80	70	95
										(81)		(26)	

EXAMPLE 40

The following procedure shows interaction between herbicide and antidote when both are incorporated in a soil cover layer before emergence of crop and weed species. Containers were filled and compacted with a fumigated silt loam top soil to a depth of about 1.3 cm from the top of the container. A first container was designated as an untreated control, a second container was designated as a herbicide control, and a third container was designated as a herbicide + antidote test container. Each of the containers was seeded with a crop species. A measured amount of herbicide dispersed or dissolved in acetone was applied to a measured quantity of soil. To this same quantity of soil treated with herbicide, there was added a measured amount of antidote

dispersed or dissolved in acetone. The quantity of soil treated with the herbicide and antidote was thoroughly mixed to incorporate the herbicide and antidote in the soil uniformly. The seed bed in the third container of soil was covered with the soil treated with the herbicide and antidote and the container was leveled. For each test series, the seed beds of the first and second containers were likewise covered by soil layers. The cover layer of the first container was not treated with herbicide or antidote. The cover layer of the second container had a measured quantity of herbicide along incorporated therein. The containers were then placed on a bench in a greenhouse and sub-irrigated as required for the duration of the test. Plant response was observed about three weeks after initial treatment. Results are reported in Table 3.

25

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TABLE 3-continued

6	.56	20	.56	75	95	95	95	95	95	100	100	100	100
6	.56	20	2.24	70	(21)	95	(0)	95	(0)	95	(0)	95	(0)
6	.56	20	8.96	75	(26)	95	(0)	95	(0)	95	(0)	95	(0)
6	2.24	20	.56	95	(21)	100	(0)	100	(0)	100	(0)	100	(0)
6	2.24	20	2.24	95	(5)	100	(0)	95	(0)	100	(0)	100	(0)
6	2.24	20	8.96	95	(5)	100	(5)	100	(5)	100	(5)	100	(5)
6	3.36	20	.56		(5)	95	100	70	40	95	100	70	40
6	3.36	20	2.24			95	(5)	100	(0)	95	100	0	40
6	3.36	20	8.96			95	(5)	100	(100)	95	100	60	40
6	6.72	20	.56			100	(5)	100	(0)	100	100	100	82
6	6.72	20	2.24			95	(0)	100	(0)	95	100	30	82
6	6.72	20	8.96			95	(5)	100	(63)	95	100	50	82
1	.28	1	.56			95	(5)	100	(39)	95	100	50	82
1	.28	1	2.24			95	(0)	95		95	(0)	95	
1	.28	1	8.96			90	(0)	95		90	(0)	95	
1	1.12	1	.56			100	(5)	100		100	100	100	
1	1.12	1	2.24			100	(0)	100		100	(0)	100	
1	1.12	1	8.96			95	(0)	100		95	(0)	100	
1	.28	3	.56			95	(5)	95		95	(5)	95	
1	.28	3	2.24			95	(0)	95		95	(0)	95	
1	.28	3	8.96			90	(0)	95		90	(0)	95	
1	1.12	3	.56			95	(5)	100		95	(5)	100	
1	1.12	3	2.24			100	(5)	100		100	(5)	100	
1	1.12	3	8.96			100	(0)	100		100	(0)	100	
1	.28	20	.56			90	(0)	95		90	(0)	95	
1	.28	20	2.24			70	(5)	95		70	(5)	95	
1	.28	20	8.96			95	(26)	95		95	(26)	95	

TABLE 3-continued

1	1.12	20	.56						(0)	100	100
1	1.12	20	2.24						(5)	100	(0)
1	1.12	20	8.96						(0)	100	(0)
2	.56	1	.14	70	97					100	100
2	.56	1	.14	50	(27)	42				100	(0)
2	.56	1	.14	5	(0)	53				98	95
2	.56	1	.14	45	(90)	97				100	(0)
2	.56	1	.14	5	(53)	25				100	(0)
2	.56	1	.14	40	(80)	32				100	98
2	.56	1	.56	0	(0)	42				100	(0)
2	.56	1	.56	10	(100)	25				100	100
2	.56	1	.56	10	(60)	53				98	98
2	.56	1	.56	70	(81)	97				95	95
2	.56	1	.56	10	(27)	32				100	(0)
2	.56	1	.56	15	(68)	97				100	(0)
2	.56	1	.56	15	(84)	90				95	100
2	.56	1	.56	60	(83)	90				95	(5)
2	.56	1	.56	0	(33)	95				100	(5)
2	.56	1	.56	0	(100)	77				100	(0)
2	.56	1	.56	20	(100)	60				100	(0)
2	.56	1	.56	20	(66)	83				95	100
2	.56	1	.56	10	(75)	93				100	(5)
2	.56	1	.56	10	(89)	60				100	(0)
2	.56	1	.56	25	(83)	90				95	100
2	.56	1	.56	5	(72)	80				95	(5)
2	.56	1	.56	0	(93)	93				100	100
					(100)						(0)

TABLE 3-continued

2	.56	1	.56	5	75	100	100
					(93)	(0)	90
2	.56	1	.56	15	35	95	90
					(57)	(0)	100
2	.56	1	.56	10	95	100	100
					(89)	(0)	95
2	.56	1	.56	20	65	100	100
					(69)	(0)	100
2	.56	1	.56	5	85	95	100
					(94)	(0)	100
2	.56	1	.56	5	95	95	100
					(94)	(5)	100
2	.56	1	.56	10	85	100	100
					(88)	(0)	100
2	.56	1	.56	55	95	100	100
					(42)	(0)	100
2	.56	1	.56	25	95	100	100
					(73)	(0)	100
2	.56	1	.56	10	70	95	100
					(85)	(5)	95
2	.56	1	.56	10	90	95	95
					(88)	(0)	95
2	.56	1	.56	15	80	95	95
					(81)	(0)	100
2	.56	1	.56	5	90	95	100
					(94)	(5)	100
2	.56	1	.56	10	80	95	100
					(87)	(5)	100
2	.56	1	.56	15	95	95	95
					(84)	(5)	95
2	.56	1	.56	30	28	95	95
					(0)	(0)	100
2	.56	1	.56	20	85	95	100
					(76)	(5)	100
2	.56	1	.56	30	95	100	100
					(68)	(0)	95
2	.56	1	.56	10	30	95	95
					(66)	(0)	95
2	.56	1	.56	20	55	100	100
					(63)	(0)	100
2	.56	1	.56	0	95	100	100
					(100)	(0)	100
2	.56	1	.56	10	70	95	100
					(85)	(5)	100
2	.56	1	.56	35	95	100	100
					(63)	(0)	100
2	.56	1	.56	5	95	100	100
					(94)	(0)	100
2	.56	1	.56	15	80	95	100
					(81)	(5)	100
2	.56	1	.56	25	95	100	100
					(73)	(0)	95
2	.56	1	.56	45	85	100	95
					(73)	(0)	95

100 100
(0)

TABLE 3-continued

2	.56	1	2.24	10	30	90	95
2	.56	1	2.24	20	(66)	100	(5)
2	.56	1	2.24	15	(77)	95	(0)
2	.56	1	2.24	35	(84)	95	(5)
2	.56	1	2.24	15	(36)	90	(0)
2	.56	1	2.24	20	(82)	100	(10)
2	.56	1	2.24	15	(28)	100	(0)
2	.56	1	2.24	40	(81)	100	(0)
2	.56	1	2.24	5	(57)	95	(0)
2	.56	1	2.24	0	(93)	100	(0)
2	.56	1	2.24	15	(100)	95	(0)
2	.56	1	2.24	5	(83)	100	(5)
2	.56	1	2.24	35	(94)	90	(0)
2	.56	1	2.24	30	(50)	100	(10)
2	.56	1	2.24	5	(68)	95	(0)
2	.56	1	2.24	15	(94)	100	(5)
2	.56	1	2.24	5	(85)	100	(0)
2	.56	1	2.24	20	(93)	100	(0)
2	.56	1	2.24	20	(75)	95	(0)
2	.56	1	2.24	10	(69)	100	(0)
2	.56	1	2.24	0	(83)	100	(0)
2	.56	1	2.24	20	(100)	95	(0)
2	.56	1	2.24	0	(78)	100	(5)
2	.56	1	2.24	15	(100)	90	(0)
2	.56	1	2.24	30	(57)	95	(0)
2	.56	1	2.24	15	(66)	95	(0)
2	.56	1	2.24	0	(82)	100	(5)

TABLE 3-continued

2	.56	1	2.24	0	(100)	77	100	(0)
2	.56	1	2.24	25	(100)	60	95	(0)
2	.56	1	8.96	0	(58)	95	100	(5)
2	.56	1	8.96	25	(100)	60	90	(0)
2	.56	1	8.96	0	(58)	85	95	(10)
2	.56	1	8.96	10	(100)	35	100	(5)
2	.56	1	8.96	20	(71)	77	100	(0)
2	.56	1	8.96	10	(74)	95	100	(0)
2	.56	1	8.96	10	(89)	95	95	(0)
2	.56	1	8.96	10	(89)	93	95	(5)
2	.56	1	8.96	5	(100)	65	100	(5)
2	.56	1	8.96	10	(92)	70	100	(0)
2	.56	1	8.96	10	(85)	75	90	(0)
2	.56	1	8.96	5	(86)	85	95	(10)
2	.56	1	8.96	30	(94)	95	95	(5)
2	.56	1	8.96	50	(68)	55	95	(0)
2	.56	1	8.96	30	(9)	80	95	(5)
2	.56	1	8.96	10	(62)	28	90	(5)
2	.56	1	8.96	0	(64)	90	95	(5)
2	.56	1	8.96	15	(100)	95	95	(5)
2	.56	1	8.96	10	(84)	80	90	(5)
2	.56	1	8.96	15	(87)	70	100	(10)
2	.56	1	8.96	5	(78)	90	95	(0)
2	.56	1	8.96	30	(94)	93	100	(0)
2	.56	1	8.96	10	(67)	75	100	(0)
2	.56	1	8.96	20	(86)	95	95	(0)
2	.56	1	8.96	20	(78)	95	95	(5)

100 100
(0)

TABLE 3-continued

2	.56	1	8.96	25	90	95	100
					(72)	(5)	(5)
2	.56	1	8.96	15	90	95	100
					(83)	(5)	(5)
2	.56	1	8.96	30	85	95	95
					(64)	(0)	(0)
2	.56	1	8.96	15	30	95	95
					(50)	(0)	(0)
2	.56	1	8.96	30	95	95	100
					(68)	(5)	(5)
2	.56	1	8.96	10	100	80	100
					(90)	(20)	(20)
2	.56	1	8.96	0	80	85	95
					(100)	(10)	(10)
2	.56	1	8.96	20	95	95	100
					(78)	(5)	(5)
2	.56	1	8.96	20	95	95	100
					(78)	(5)	(5)
2	.56	1	8.96	0	85	95	100
					(100)	(5)	(5)
2	.56	1	8.96	25	95	100	100
					(73)	(0)	(0)
2	.56	1	8.96	20	80	95	100
					(75)	(5)	(5)
2	.56	1	8.96	20	83	95	98
					(75)	(3)	(3)
2	.56	1	8.96	10	95	100	100
					(89)	(0)	(0)
2	.56	1	8.96	20	90	95	95
					(77)	(0)	(0)
2	.56	1	8.96	0	95	95	100
					(100)	(5)	(5)
2	.56	1	8.96	10	90	95	100
					(88)	(5)	(5)
2	.56	1	8.96	10	60	90	100
					(83)	(10)	(10)

2	.56	1	8.96	25	85	95	100
2	.56	1	8.96	10	(70)	(5)	100
2	1.12	1	2.24		(89)	(0)	100
2	1.12	1	8.96			(0)	100
2	2.24	1	.14	50	93	(0)	98
2	2.24	1	.14	10	(46)	(0)	100
2	2.24	1	.14	80	(89)	(0)	100
2	2.24	1	.14	40	(0)	(0)	100
2	2.24	1	.14	60	(56)	(0)	100
2	2.24	1	.14	25	(40)	(0)	100
2	2.24	1	.14	30	(46)	(0)	100
2	2.24	1	.14	5	(69)	(0)	100
2	2.24	1	.14	85	(94)	(0)	100
2	2.24	1	.14	30	(8)	(0)	100
2	2.24	1	.14	85	(62)	(0)	100
2	2.24	1	.14	60	(13)	(0)	100
2	2.24	1	.14	15	(40)	(0)	98
2	2.24	1	.14	60	(83)	(0)	100
2	2.24	1	.14	85	(40)	(0)	100
2	2.24	1	.14	20	(15)	(0)	100
2	2.24	1	.56	85	(77)	(0)	100
2	2.24	1	.56	35	(8)	(0)	100
2	2.24	1	.56	35	(62)	(0)	98
2	2.24	1	.56	15	(61)	(0)	98
2	2.24	1	.56	60	(84)	(0)	100
2	2.24	1	.56	95	(40)	(0)	100
2	2.24	1	.56	40	(5)	(0)	100
2	2.24	1	.56	40	(14)	(0)	100

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2	2.24	1	.56	5	80	100	100
					(93)	(0)	(0)
2	2.24	1	.56	80	98	100	100
					(18)	(0)	(0)
2	2.24	1	.56	15	97	100	100
					(84)	(0)	(0)
2	2.24	1	.56	20	92	100	100
					(78)	(0)	(0)
2	2.24	1	.56	75	100	100	100
					(25)	(0)	(0)
2	2.24	1	.56	30	77	100	100
					(61)	(0)	(0)
2	2.24	1	.56	45	100	100	100
					(55)	(0)	(0)
2	2.24	1	.56	75	98	100	100
					(23)	(0)	(0)
2	2.24	1	.56	55	95	100	100
					(42)	(0)	(0)
2	2.24	1	.56	10	95	100	100
					(89)	(0)	(0)
2	2.24	1	.56	15	95	100	100
					(84)	(0)	(0)
2	2.24	1	.56	55	95	100	100
					(42)	(0)	(0)
2	2.24	1	.56	35	90	100	100
					(61)	(0)	(0)
2	2.24	1	.56	55	100	100	100
					(45)	(0)	(0)
2	2.24	1	.56	5	100	100	100
					(95)	(0)	(0)
2	2.24	1	.56	15	95	100	100
					(84)	(0)	(0)
2	2.24	1	.56	30	95	100	100
					(68)	(0)	(0)
2	2.24	1	.56	35	95	95	100
					(63)	(0)	(5)
2	2.24	1	.56	60	95	90	73
					(36)	(0)	(0)
2	2.24	1	.56	15	92	100	100
					(83)	(0)	(0)
2	2.24	1	.56	30	95	100	100
					(68)	(0)	(0)
2	2.24	1	.56	40	95	100	100
					(57)	(0)	(0)
2	2.24	1	.56	40	80	100	95
					(50)	(0)	(0)
2	2.24	1	.56	35	95	100	100
					(63)	(0)	(0)
2	2.24	1	.56	25	95	100	100
					(73)	(0)	(0)
2	2.24	1	.56	10	95	100	100
					(89)	(0)	(0)
2	2.24	1	.56	0	62	100	100
					(100)	(0)	(0)

100 100
(0)

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2	2.24	1	.56.	30	90	100	100
2	2.24	1	.56	40	(66)	(0)	100
2	2.24	1	.56	20	(57)	(0)	100
2	2.24	1	.56	10	(78)	(0)	100
2	2.24	1	.56	50	(89)	(0)	100
2	2.24	1	.56	40	(47)	(0)	100
2	2.24	1	.56	25	(55)	(0)	100
2	2.24	1	.56	75	(73)	(5)	100
2	2.24	1	.56	60	(21)	(0)	100
2	2.24	1	.56	40	(40)	(0)	100
2	2.24	1	.56	55	(57)	(5)	100
2	2.24	1	.56	5	(45)	(0)	100
2	2.24	1	.56	20	(93)	(0)	100
2	2.24	1	.56	10	(78)	(0)	100
2	2.24	1	.56	40	(88)	(0)	100
2	2.24	1	.56	60	(57)	(0)	100
2	2.24	1	.56	5	(36)	(0)	100
2	2.24	1	.56	65	(94)	(0)	100
2	2.24	1	.56	30	(31)	(0)	100
2	2.24	1	.56	35	(64)	(0)	100
2	2.24	1	.56	40	(63)	(0)	100
2	2.24	1	.56	15	(57)	(0)	100
2	2.24	1	.56	20	(85)	(0)	100
2	2.24	1	.56	5	(78)	(0)	100
2	2.24	1	.56	20	(94)	(0)	100
2	2.24	1	.56	25	(75)	(0)	100
2	2.24	1	.56	40	(74)	(0)	100
2	2.24	1	.56	40	(57)	(0)	100

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2	2.24	1	2.24	0	98	100	100
2	2.24	1	2.24	10	(100)	(0)	100
2	2.24	1	2.24	20	(87)	(0)	100
2	2.24	1	2.24	55	(80)	(0)	100
2	2.24	1	2.24	65	(45)	(0)	100
2	2.24	1	2.24	25	(33)	(0)	100
2	2.24	1	2.24	15	(74)	(5)	98
2	2.24	1	2.24	20	(83)	(0)	98
2	2.24	1	2.24	35	(78)	(0)	100
2	2.24	1	2.24	30	(65)	(0)	100
2	2.24	1	2.24	10	(68)	(0)	100
2	2.24	1	2.24	15	(78)	(0)	100
2	2.24	1	2.24	60	(83)	(0)	100
2	2.24	1	2.24	45	(40)	(0)	100
2	2.24	1	2.24	0	(51)	(0)	100
2	2.24	1	2.24	10	(100)	(0)	100
2	2.24	1	2.24	10	(87)	(0)	100
2	2.24	1	2.24	40	(89)	(0)	100
2	2.24	1	2.24	15	(59)	(0)	100
2	2.24	1	2.24	30	(82)	(0)	100
2	2.24	1	2.24	70	(68)	(0)	100
2	2.24	1	2.24	40	(26)	(0)	100
2	2.24	1	2.24	5	(57)	(0)	100
2	2.24	1	2.24	30	(94)	(5)	95
2	2.24	1	2.24	25	(68)	(0)	100
2	2.24	1	2.24	45	(75)	(0)	100
2	2.24	1	2.24	45	(52)	(0)	95
2	2.24	1	2.24	45	(47)	(5)	100
						(0)	(0)

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2	2.24	1	2.24	20	85	100	100
2	2.24	1	2.24	10	(76)	(0)	100
2	2.24	1	2.24	15	(89)	(0)	100
2	2.24	1	2.24	55	(85)	(0)	100
2	2.24	1	2.24	5	(42)	(0)	100
2	2.24	1	2.24	30	(95)	(0)	100
2	2.24	1	2.24	40	(70)	(0)	100
2	2.24	1	2.24	40	(57)	(0)	100
2	2.24	1	2.24	40	(57)	95	100
2	2.24	1	2.24	15	(81)	(5)	100
2	2.24	1	2.24	35	(63)	(0)	100
2	2.24	1	2.24	10	(89)	(0)	100
2	2.24	1	2.24	65	(31)	(0)	100
2	2.24	1	2.24	20	(80)	(0)	100
2	2.24	1	2.24	10	(88)	(0)	100
2	2.24	1	2.24	30	(68)	(0)	100
2	2.24	1	2.24	20	(78)	(0)	100
2	2.24	1	2.24	35	(63)	(0)	100
2	2.24	1	2.24	15	(75)	(0)	100
2	2.24	1	2.24	20	(80)	95	95
2	2.24	1	2.24	65	(31)	(0)	100
2	2.24	1	2.24	10	(89)	(0)	100
2	2.24	1	2.24	10	(88)	(0)	100
2	2.24	1	2.24	35	(63)	(0)	100
2	2.24	1	2.24	30	(63)	(0)	100
2	2.24	1	2.24	30	(68)	(0)	100
2	2.24	1	2.24	30	(68)	80	73
2	2.24	1	2.24	35	(63)	(0)	100

100 (0) 100

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2	2.24	1	2.24	20	90	100	100
2	2.24	1	2.24	30	(77)	(0)	100
2	2.24	1	2.24	0	(68)	(0)	100
2	2.24	1	2.24	35	(100)	(0)	100
2	2.24	1	2.24	45	(63)	(0)	100
2	2.24	1	2.24	30	(52)	(0)	100
2	2.24	1	2.24	15	(68)	(0)	100
2	2.24	1	2.24	45	(85)	(0)	100
2	2.24	1	4.48	20	(52)	(0)	100
2	2.24	1	8.96	20	(78)	(0)	100
2	2.24	1	8.96	15	(78)	(0)	100
2	2.24	1	8.96	20	(84)	(0)	100
2	2.24	1	8.96	20	(78)	(0)	100
2	2.24	1	8.96	15	(78)	(0)	100
2	2.24	1	8.96	15	(84)	(0)	100
2	2.24	1	8.96	10	(84)	(0)	100
2	2.24	1	8.96	20	(89)	(0)	100
2	2.24	1	8.96	15	(67)	(0)	100
2	2.24	1	8.96	35	(83)	(5)	100
2	2.24	1	8.96	15	(63)	(0)	100
2	2.24	1	8.96	40	(84)	(0)	100
2	2.24	1	8.96	25	(57)	(0)	100
2	2.24	1	8.96	35	(68)	(0)	100
2	2.24	1	8.96	30	(63)	(0)	100
2	2.24	1	8.96	10	(68)	(0)	100
2	2.24	1	8.96	20	(89)	(0)	100
2	2.24	1	8.96	20	(80)	(0)	100

40 73
(45)

100 100
(0)

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2	2.24	1	8.96	20	85	100	100
2	2.24	1	8.96	40	(76)	(0)	100
2	2.24	1	8.96	25	(60)	(0)	100
2	2.24	1	8.96	10	(75)	(0)	100
2	2.24	1	8.96	55	(89)	(0)	100
2	2.24	1	8.96	35	(42)	(0)	100
2	2.24	1	8.96	10	(63)	(0)	100
2	2.24	1	8.96	10	(88)	(0)	100
2	2.24	1	8.96	25	(68)	(0)	100
2	2.24	1	8.96	15	(84)	(0)	100
2	2.24	1	8.96	35	(58)	(0)	100
2	2.24	1	8.96	10	(90)	(0)	100
2	2.24	1	8.96	5	(94)	(0)	100
2	2.24	1	8.96	15	(84)	(0)	100
2	2.24	1	8.96	35	(65)	(0)	100
2	2.24	1	8.96	25	(73)	(0)	100
2	2.24	1	8.96	0	(100)	(0)	100
2	2.24	1	8.96	55	(42)	(0)	100
2	2.24	1	8.96	55	(42)	(0)	100
2	2.24	1	8.96	45	(52)	(0)	100
2	2.24	1	8.96	10	(89)	(0)	100
2	2.24	1	8.96	20	(78)	(0)	100
2	2.24	1	8.96	35	(61)	(0)	100
2	2.24	1	8.96	30	(62)	(0)	95
2	2.24	1	8.96	10	(89)	(0)	100
2	2.24	1	8.96	35	(63)	(0)	100
2	2.24	1	8.96	0	(100)	(0)	100
2	2.24	1	8.96	35	(65)	(0)	100

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2	4.48	1	2.24		95	95
2	4.48	1	8.96		(0)	95
2	.56	2	.56	25	(5)	
2	.56	2	.56	20	(70)	85
2	.56	2	.56	10	(69)	65
2	.56	2	.56	20	(89)	95
2	.56	2	.56	5	(33)	30
2	.56	2	.56	15	(94)	85
2	.56	2	2.24	10	(84)	95
2	.56	2	2.24	65	(88)	85
2	.56	2	2.24	0	(23)	85
2	.56	2	2.24	25	(100)	30
2	.56	2	2.24	20	(73)	95
2	.56	2	2.24	20	(69)	65
2	.56	2	2.24	20	(78)	95
2	.56	2	8.96	25	(70)	85
2	.56	2	8.96	30	(64)	85
2	.56	2	8.96	20	(33)	30
2	.56	2	8.96	0	(100)	95
						(5)

2	.56	2	8.96	15	.65	95	95
2	.56	2	8.96	15	(76)	(0)	100
2	2.24	2	.56	10	(84)	(5)	100
2	2.24	2	.56	25	(89)	(0)	100
2	2.24	2	.56	35	(70)	(0)	100
2	2.24	2	.56	10	(63)	(0)	95
2	2.24	2	.56	40	(87)	(0)	100
2	2.24	2	.56	45	(55)	(0)	100
2	2.24	2	2.24	40	(52)	(0)	100
2	2.24	2	2.24	25	(57)	(0)	100
2	2.24	2	2.24	5	(73)	(0)	95
2	2.24	2	2.24	50	(93)	(0)	100
2	2.24	2	2.24	30	(44)	(0)	100
2	2.24	2	2.24	40	(64)	(0)	100
2	2.24	2	8.96	25	(57)	(90)	100
2	2.24	2	8.96	25	(72)	(0)	100
2	2.24	2	8.96	25	(73)	(0)	100
2	2.24	2	8.96	15	(68)	(0)	95
2	2.24	2	8.96	40	(82)	(0)	100
2	2.24	2	8.96	10	(57)	(0)	100
2	.56	3	.14	70	(89)	(0)	100
2	.56	3	.14	0	(27)	(0)	100
2	.56	3	.14	35	(100)	95	95
2	.56	3	.14	0	(0)	(0)	100
2	.56	3	.14	5	(100)	(0)	98
2	.56	3	.14	85	(88)	(0)	100
2	.56	3	.56	75	(12)	(0)	100
2	.56	3	.56	75	(22)	(0)	100

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2	.56	3	.56	95	97	100	100
2	.56	3	.56	10	(2)	(0)	(0)
2	.56	3	.56	30	(68)	(0)	100
2	.56	3	.56	15	(43)	(0)	95
2	.56	3	.56	20	(64)	(0)	100
2	.56	3	.56	5	(20)	(0)	98
2	.56	3	.56	40	(94)	(0)	95
2	.56	3	.56	20	(57)	(0)	100
2	.56	3	.56	15	(69)	(0)	95
2	.56	3	.56	10	(84)	(5)	100
2	.56	3	.56	10	(66)	(0)	95
2	.56	3	2.24	10	(89)	(0)	100
2	.56	3	2.24	5	(80)	(0)	98
2	.56	3	2.24	65	(32)	(0)	100
2	.56	3	2.24	5	(84)	(2)	100
2	.56	3	2.24	10	(81)	(0)	95
2	.56	3	2.24	10	(76)	(0)	100
2	.56	3	2.24	10	(84)	(0)	95
2	.56	3	2.24	20	(33)	(0)	95
2	.56	3	2.24	10	(89)	(0)	100
2	.56	3	2.24	30	(68)	(0)	100
2	.56	3	2.24	20	(76)	(0)	95
2	.56	3	8.96	25	(70)	(0)	95
2	.56	3	8.96	5	(92)	(0)	95
2	.56	3	8.96	20	(78)	(0)	100
2	.56	3	8.96	30	(0)	(0)	95
2	.56	3	8.96	15	(84)	(0)	100
2	2.24	3	.14	55	(40)	(0)	98

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2	2.24	3	2.24	20	90	100
2	2.24	3	2.24	50	(77)	(0)
2	2.24	3	2.24	45	(37)	100
2	2.24	3	2.24	25	(4)	(0)
2	2.24	3	2.24	20	(67)	100
2	2.24	3	2.24	15	(78)	(0)
2	2.24	3	2.24	40	(82)	100
2	2.24	3	2.24	10	(57)	(0)
2	2.24	3	2.24	15	(87)	95
2	2.24	3	2.24	35	(83)	(0)
2	2.24	3	8.96	10	(63)	100
2	2.24	3	8.96	10	(88)	(0)
2	2.24	3	8.96	15	(88)	100
2	2.24	3	8.96	50	(81)	(0)
2	.56	4	.56	40	(47)	95
2	.56	4	2.24	20	(55)	(5)
2	.56	4	8.96	30	(77)	100
2	2.24	4	.56	40	(66)	(5)
2	2.24	4	2.24	60	(57)	100
2	2.24	4	8.96	50	(36)	(0)
2	.56	5	.56	30	(47)	(0)
2	.56	5	2.24	25	(66)	(5)
2	.56	5	8.96	40	(72)	(5)
2	2.24	5	.56	50	(55)	(5)
2	2.24	5	2.24	30	(47)	100
2	2.24	5	8.96	20	(68)	(0)
2	.56	13	.56	55	(78)	100
					(42)	(0)

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2	.56	13	.56	65	95	100	100
					(31)	(0)	(0)
2	.56	13	2.24	35	95	100	100
2	.56	13	2.24	35	(63)	(0)	(0)
2	.56	13	8.96	60	(63)	(0)	(0)
2	.56	13	8.96	30	(36)	(5)	(5)
2	2.24	13	.56	85	(68)	(10)	(10)
2	2.24	13	.56	95	(10)	(0)	(0)
2	2.24	13	2.24	50	(0)	(0)	(0)
2	2.24	13	2.24	65	(47)	(0)	(0)
2	2.24	13	8.96	50	(31)	(0)	(0)
2	2.24	13	8.96	60	(47)	(0)	(0)
2	.56	27	.56	20	(36)	(0)	(0)
2	.56	27	.56	25	(69)	(0)	(0)
2	.56	27	2.24	10	(16)	(0)	(0)
2	.56	27	2.24	15	(66)	(0)	(0)
2	.56	27	8.96	15	(76)	(0)	(0)
2	.56	27	8.96	15	(50)	(0)	(0)
2	2.24	27	.56	30	(76)	(5)	(5)
2	2.24	27	.56	55	(62)	(0)	(0)
2	2.24	27	2.24	60	(35)	(0)	(0)
2	2.24	27	2.24	40	(25)	(0)	(0)
2	2.24	27	8.96	5	(52)	(5)	(5)
2	2.24	27	8.96	35	(93)	(0)	(0)
2	.56	7	.56	40	(58)	(0)	(0)
2	.56	7	.56	5	(52)	(0)	(0)
2	.56	7	2.24	25	(83)	(5)	(5)
2	.56	7	2.24	10	(70)	(0)	(0)
					(66)	(0)	(0)

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2	.56	7	8.96	10	85	100	95
2	.56	7	8.96	15	(88)	(0)	(0)
2	2.24	7	.56	30	(50)	95	95
2	2.24	7	.56	30	(66)	100	100
2	2.24	7	2.24	15	(62)	(0)	95
2	2.24	7	2.24	20	(83)	100	100
2	2.24	7	8.96	0	(75)	95	95
2	2.24	7	8.96	35	(100)	(0)	95
2	.56	28	.56	10	(61)	(0)	100
2	.56	28	.56	20	(66)	95	95
2	.56	28	2.24	20	(69)	(0)	95
2	.56	28	2.24	30	(33)	95	95
2	.56	28	8.96	10	(53)	(0)	95
2	.56	28	8.96	20	(66)	(0)	95
2	2.24	28	.56	55	(69)	95	95
2	2.24	28	.56	50	(35)	100	100
2	2.24	28	2.24	50	(37)	(0)	95
2	2.24	28	2.24	35	(41)	100	100
2	2.24	28	8.96	40	(56)	(0)	95
2	2.24	28	8.96	20	(52)	(0)	100
2	.56	8	.56	10	(75)	(5)	95
2	.56	8	2.24	10	(84)	(0)	95
2	.56	8	8.96	20	(84)	(0)	95
2	2.24	8	.56	20	(69)	100	95
2	2.24	8	2.24	30	(76)	(0)	100
2	2.24	8	8.96	15	(64)	100	100
2	.56	29	.56	35	(82)	(0)	100
					(46)	95	95

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2	.56	29	2.24	50	65	100	95
				(23)		(0)	(0)
2	.56	29	8.96	15	65	95	95
2	2.24	29	.56	80	85	100	100
				(5)		(0)	(0)
2	2.24	29	2.24	70	85	95	100
				(17)		(5)	(0)
2	2.24	29	8.96	65	85	100	100
				(23)		(0)	(0)
2	.56	14	.56	10	65	95	95
				(84)		(0)	(0)
2	.56	14	2.24	30	65	95	95
				(53)		(0)	(0)
2	.56	14	8.96	15	65	95	95
				(76)		(0)	(0)
2	2.24	14	.56	30	85	100	100
				(64)		(0)	(0)
2	2.24	14	2.24	25	85	95	100
				(70)		(5)	(0)
2	2.24	14	8.96	30	85	100	100
				(64)		(0)	(0)
2	.56	30	.56	45	65	100	95
				(30)		(0)	(0)
2	.56	30	.56	55	85	100	95
				(35)		(0)	(0)
2	.56	30	2.24	25	85	100	95
				(70)		(0)	(0)
2	.56	30	2.24	25	65	95	95
				(61)		(0)	(0)
2	.56	30	8.96	40	85	100	95
				(52)		(0)	(0)
2	.56	30	8.96	30	65	90	95
				(53)		(5)	(0)
2	2.24	30	.56	70	90	100	100
				(22)		(0)	(0)
2	2.24	30	.56	85	85	100	100
				(0)		(0)	(0)
2	2.24	30	2.24	85	85	100	100
				(0)		(0)	(0)
2	2.24	30	2.24	75	90	100	100
				(16)		(0)	(0)
2	2.24	30	8.96	55	90	100	100
				(38)		(0)	(0)
2	2.24	30	8.96	65	85	100	100
				(23)		(0)	(0)
2	.56	15	.56	35	65	95	95
				(46)		(0)	(0)
2	.56	15	.56	40	85	100	95
				(52)		(0)	(0)
2	.56	15	2.24	30	65	100	95
				(53)		(0)	(0)
2	.56	15	2.24	20	85	95	95
				(76)		(0)	(0)

2	.56	16	2.24	15	65	90	95
2	.56	16	8.96	15	(76)	90	(5)
2	2.24	16	.56	40	(76)	100	(5)
2	2.24	16	2.24	20	(52)	95	(0)
2	2.24	16	8.96	40	(76)	95	(5)
2	.56	9	.56	0	(52)	100	(5)
2	.56	9	2.24	15	(100)	100	(0)
2	.56	9	8.96	0	(82)	100	(0)
2	2.24	9	.56	35	(100)	100	(0)
2	2.24	9	2.24	5	(63)	100	(0)
2	2.24	9	8.96	20	(94)	100	(0)
2	.56	10	.56	25	(78)	100	(0)
2	.56	10	2.24	15	(68)	100	(0)
2	.56	10	8.96	10	(81)	100	(0)
2	2.24	10	.56	70	(87)	100	(0)
2	2.24	10	2.24	35	(26)	100	(0)
2	2.24	10	8.96	30	(63)	100	(0)
2	.56	11	.56	30	(68)	100	(0)
2	.56	11	2.24	40	(64)	100	(0)
2	.56	11	8.96	100	(52)	100	(0)
2	2.24	11	.56	90	(0)	100	(0)
2	2.24	11	2.24	50	(0)	100	(0)
2	2.24	11	8.96	35	(44)	100	(0)
2	.56	17	.56	60	(61)	100	(0)
2	.56	17	2.24	45	(29)	100	(0)
2	.56	17	8.96	35	(47)	100	(0)
2	2.24	17	.56	95	(58)	100	(0)
					(0)	100	(0)

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2	2.24	17	2.24	90	95	100	100
2	2.24	17	8.96	65	(5)	(0)	100
2	.56	20	.14	5	(31)	(0)	100
2	.56	20	.14	5	(90)	(0)	95
2	.56	20	.14	10	(84)	(2)	100
2	.56	20	.56	10	(60)	(0)	98
2	.56	20	.56	0	(68)	(10)	100
2	.56	20	.56	15	(100)	(0)	95
2	.56	20	.56	30	(40)	(0)	98
2	.56	20	2.24	5	(64)	(0)	100
2	.56	20	2.24	5	(84)	(10)	100
2	.56	20	2.24	0	(80)	(0)	95
2	.56	20	2.24	15	(100)	(0)	95
2	.56	20	8.96	15	(82)	(5)	100
2	2.24	20	.14	20	(82)	(0)	100
2	2.24	20	.14	10	(74)	(0)	100
2	2.24	20	.14	10	(78)	(0)	100
2	2.24	20	.56	10	(89)	(0)	98
2	2.24	20	.56	25	(78)	(0)	100
2	2.24	20	.56	25	(67)	(0)	100
2	2.24	20	.56	5	(72)	(0)	98
2	2.24	20	2.24	10	(94)	(0)	100
2	2.24	20	2.24	20	(89)	(0)	98
2	2.24	20	2.24	30	(74)	(0)	100
2	2.24	20	2.24	30	(36)	(0)	100
2	2.24	20	8.96	25	(68)	(0)	100
2	2.24	12	.14	40	(73)	(0)	100
					(55)	(0)	100

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2	2.24	12	.14	20	97	100	100
2	2.24	12	.56	25	(79)	(0)	100
2	2.24	12	.56	55	(74)	(0)	100
2	2.24	12	2.24	0	(38)	(0)	100
2	2.24	12	2.24	30	(100)	(0)	100
2	2.24	18	.14	70	(66)	(0)	100
2	2.24	18	.56	70	(23)	(0)	100
2	2.24	18	2.24	30	(23)	(0)	100
2	.56	24	.14	65	(67)	(0)	100
2	.56	24	.56	40	(32)	(0)	100
2	.56	24	2.24	20	(58)	(0)	100
2	2.24	24	.14	85	(79)	(0)	100
2	2.24	24	.14	75	(15)	(0)	100
2	2.24	24	.56	75	(23)	(0)	100
2	2.24	24	.56	90	(23)	(0)	100
2	2.24	24	2.24	85	(10)	(0)	100
2	2.24	24	2.24	85	(15)	(0)	100
2	.56	26	.14	50	(13)	(0)	100
2	.56	26	.56	10	(0)	(0)	100
2	.56	26	2.24	5	(76)	(0)	100
2	2.24	26	.14	5	(88)	(0)	100
2	2.24	26	.56	30	(93)	(0)	100
2	2.24	26	2.24	5	(62)	(0)	100
2	.56	19	.14	80	(93)	(0)	100
2	.56	19	.56	55	(17)	(0)	100
2	.56	19	2.24	35	(43)	(0)	100
2	2.24	19	.14	100	(63)	(0)	100
					(0)		

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2	2.24	19	.14	95	100	100	100
2	2.24	19	.56	95	(5)	(0)	100
2	2.24	19	.56	80	(5)	(0)	100
2	2.24	19	2.24	75	(18)	(0)	100
2	2.24	19	2.24	80	(23)	(0)	100
2	.56	23	.14	85	(20)	(0)	100
2	.56	23	.14	10	(12)	(0)	100
2	.56	23	.56	15	(76)	(0)	100
2	.56	23	.56	25	(84)	(0)	100
2	.56	23	2.24	5	(40)	(0)	100
2	.56	23	2.24	40	(88)	(0)	100
2	2.24	23	.14	50	(58)	(0)	100
2	2.24	23	.14	95	(37)	(0)	100
2	2.24	23	.56	45	(3)	(0)	100
2	2.24	23	.56	90	(43)	(0)	100
2	2.24	23	2.24	85	(8)	(0)	100
2	2.24	23	2.24	0	(13)	(0)	100
2	.56	22	.14	55	(100)	(0)	98
2	.56	22	.56	80	(0)	(2)	100
2	.56	22	2.24	10	(0)	(5)	100
2	2.24	22	.14	70	(68)	(10)	100
2	2.24	22	.56	80	(9)	(0)	100
2	2.24	22	2.24	95	(0)	(2)	100
7	.56	1	.56		(0)	(0)	100
7	.56	1	2.24		100	100	60
7	.56	1	8.96		(0)	(0)	(0)
7	1.12	1	.56		100	100	60
					(0)	(0)	(16)
					90	90	85

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7	1.12	1	2.24	100	100	80	85	(0)	(5)
7	1.12	1	8.96	100	100	95	85	(0)	(0)
3	1.12	1	.56	25	37				
3	1.12	1	2.24	(32)					
3	1.12	1	2.24	(32)					
3	1.12	1	2.24	95	95				
3	1.12	1	8.96	(0)					
3	1.12	1	8.96	15	37				
3	1.12	1	8.96	(59)					
3	1.12	1	8.96	95	95				
3	4.48	1	.56	(0)					
3	4.48	1	2.24	90	85				
3	4.48	1	2.24	(0)					
3	4.48	1	2.24	55	85				
3	4.48	1	2.24	(35)					
3	4.48	1	2.24	90	100				
3	4.48	1	8.96	(10)					
3	4.48	1	8.96	50	85				
3	4.48	1	8.96	(41)					
3	1.12	2	.56	90	100				
3	1.12	2	2.24	(10)					
3	1.12	2	8.96	35	40				
3	1.12	2	2.24	(12)					
3	1.12	2	8.96	20	40				
3	4.48	2	.56	(50)					
3	4.48	2	2.24	80	90				
3	4.48	2	2.24	(75)					
3	4.48	2	8.96	85	90				
3	4.48	2	2.24	(11)					
3	4.48	2	8.96	80	90				
3	1.12	3	.56	(5)					
3	1.12	3	2.24	(11)					
3	1.12	3	8.96	50	37				
3	1.12	3	2.24	(0)					
3	1.12	3	8.96	45	37				
3	1.12	3	2.24	(0)					
3	1.12	3	8.96	25	37				
3	4.48	3	.56	(32)					
3	4.48	3	2.24	85	85				
3	4.48	3	2.24	(0)					
3	4.48	3	8.96	75	85				
3	4.48	3	8.96	(11)					
3	1.12	20	.56	70	85				
3	1.12	20	2.24	(17)					
3	1.12	20	8.96	45	37				
3	1.12	20	2.24	(0)					
3	1.12	20	8.96	50	37				
3	1.12	20	2.24	(0)					
3	1.12	20	8.96	10	37				
3	1.12	20	2.24	(72)					

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3	4.48	20	.56			90	85	100	100	100	
3	4.48	20	2.24			(0)	(0)	100	(0)	100	
3	4.48	20	8.96			(0)	(0)	100	(0)	100	
8	.56	1	.56	65	75	(5)	(0)	100	(0)	100	100
8	.56	1	2.24	90	(13)			100	(0)	100	(0)
8	.56	1	8.96	5	(0)			100	(0)	100	(0)
8	2.24	1	.56		(93)			100	(0)	100	(0)
8	2.24	1	.56	100			50	100	(0)	100	93
8	2.24	1	2.24	(0)			(46)	100	(0)	100	
8	2.24	1	2.24				30	100	(0)	100	93
8	2.24	1	2.24	90	(10)		(67)	100	(0)	100	
8	2.24	1	8.96	100	(0)			100	(0)	100	
8	2.24	1	8.96				65	100	(0)	100	93
8	8.96	1	.56				(30)	100	(0)	100	90
8	8.96	1	2.24				95	100	(0)	100	90
8	8.96	1	8.96				95	100	(0)	100	90
8	8.96	1	8.96				40	100	(0)	100	90
8	.56	3	.56	50	75		(55)	100	(0)	100	
8	.56	3	2.24	90	(33)			100	(0)	100	
8	.56	3	8.96	25	(0)			100	(0)	100	
8	2.24	3	.56	95	(66)			100	(0)	100	
8	2.24	3	.56		(5)			100	(0)	100	
8	2.24	3	2.24	100	(0)		85	100	(0)	100	93
8	2.24	3	2.24				(8)	100	(0)	100	
8	2.24	3	8.96	95	(5)			100	(0)	100	
8	2.24	3	8.96				25	100	(0)	100	93
8	8.96	3	.56				75	100	(0)	100	(73)
8	8.96	3	2.24				60	100	(0)	100	90
8	8.96	3	8.96				65	100	(0)	100	(16)
8	8.96	3	8.96				65	100	(0)	100	(33)
8	8.96	3	8.96				65	100	(0)	100	(27)

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8	.56	20	.56	25	75	100	100	100
8	.56	20	2.24	45	(66)	100	(0)	100
8	.56	20	8.96	30	(40)	100	(0)	100
8	2.24	20	.56		(60)	100	(0)	100
8	2.24	20	.56	95	100	100	70	93
8	2.24	20	2.24	50	(5)	100	(24)	(24)
8	2.24	20	2.24	50	(50)	100	(0)	100
8	2.24	20	2.24			100	(0)	(0)
8	2.24	20	8.96			100	(0)	93
8	2.24	20	8.96	70	100	100	(0)	(24)
8	8.96	20	.56		(30)	100		100
8	8.96	20	2.24			100	95	90
8	8.96	20	8.96			100	(0)	(0)
8	8.96	20	8.96			100	30	90
9	2.24	1	.56			100	75	90
9	2.24	1	2.24			100	20	62
9	2.24	1	8.96			100	15	62
9	8.96	1	.56			100	100	62
9	8.96	1	2.24			100	85	80
9	8.96	1	2.24			100	50	80
9	8.96	1	8.96			100	70	80
9	2.24	3	.56			100	0	62
9	2.24	3	2.24			100	0	62
9	2.24	3	8.96			100	0	62
9	8.96	3	.56			100	0	80
9	8.96	3	2.24			100	0	80
9	8.96	3	8.96			100	0	80
9	2.24	20	.56			100	50	62
9	2.24	20	2.24			100	60	62
9	2.24	20	8.96			100	30	62

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		100	100	85	80		
9	8.96	20	.56	(0)	(0)	95	98
9	8.96	20	2.24	(0)	(0)	95	(3) 98
9	8.96	20	8.96	(0)	(25)	95	(3) 98
14	.56	1	.56	(0)	(12)	100	(3) 100
14	.56	1	2.24			100	(0) 100
14	.56	1	8.96			100	(0) 100
14	2.24	1	.56			100	(0) 100
14	2.24	1	2.24			100	(0) 100
14	2.24	1	8.96			100	(0) 100

14	.56	3	.56	40	73	95	98
14	.56	3	2.24	15	(45)	100	(3) 98
14	.56	3	8.96	15	(79)	100	(0) 98
14	2.24	3	.56	75	(79)	100	(0) 100
14	2.24	3	2.24	55	(21)	100	(0) 100
14	2.24	3	8.96	35	(42)	100	(0) 100
14	.56	20	.56	5	(63)	100	(0) 98
14	.56	20	2.24	5	(93)	95	(0) 98
14	.56	20	8.96	0	(93)	100	(3) 98
14	2.24	20	.56	30	(100)	100	(0) 100
14	2.24	20	2.24	15	(68)	100	(0) 100
14	2.24	20	8.96	40	(84)	100	(0) 100
4	.56	1	.56		(57)	100	(0) 65
4	.56	1	.56	80		(0)	(38) 100
4	.56	1	2.24		(17)	100	(0) 100
4	.56	1	2.24	25		(0)	(76) 65
4	.56	1	2.24		(74)	100	(0) 95
4	.56	1	8.96	15		(0)	(73) 100
4	.56	1	8.96		(84)	100	(0) 65
4	.56	1	8.96			(0)	(23) 95
4	2.24	1	.56			(0)	(94) 70
4	2.24	1	.56	95		(0)	(7) 100
4	2.24	1	2.24	85	(5)	100	(0) 100
4	2.24	1	2.24		(15)	100	(0) 100
4	2.24	1	2.24			(0)	(0) 70
4	2.24	1	8.96	80		(0)	(70) 100
4	2.24	1	8.96		(20)	100	(0) 100

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4	2.24	1	8.96	(0)	100	100	5	(78)	100	40	55
4	.56	2	.56	(0)	100	100	15	(95)	80	(27)	55
4	.56	2	2.24	(0)	100	100	5	(81)	80	(36)	55
4	.56	2	8.96	(0)	100	100	0	(93)	80	45	55
4	1.12	2	.56	(0)	100	100		(100)		(18)	
4	1.12	2	2.24	(0)	100	100					
4	1.12	2	8.96	(0)	100	100					
4	2.24	2	.56	(0)	100	100	15		95		
4	2.24	2	2.24	(0)	100	100	5	(84)	95		
4	2.24	2	8.96	(0)	100	100	5	(94)	95		
4	4.48	2	.56	(0)	100	100		(94)			
4	4.48	2	2.24	(0)	100	100					
4	4.48	2	8.96	(0)	100	100					
4	.56	3	.56	(0)	100	100				70	80
4	.56	3	.56	(0)	100	100				(12)	80
4	.56	3	.56	(0)	100	100				(0)	80
4	.56	3	2.24	(0)	100	100				70	80
4	.56	3	2.24	(0)	100	100				(12)	
4	.56	3	2.24	(0)	100	100					
4	.56	3	2.24	(0)	100	100					
4	.56	3	8.96	(0)	100	100					
4	.56	3	8.96	(0)	100	100					
4	.56	3	8.96	(0)	100	100					
4	2.24	3	.56	(5)	95	100	15	(78)	70	54	100
4	2.24	3	.56	(5)	100	100	0		70	(46)	
4	2.24	3	.56	(0)	100	100	10	(100)	90		
4	2.24	3	.56	(0)	100	100	10	(88)			
4	2.24	3	2.24	(5)	100	100				100	100
4	2.24	3	2.24	(5)	100	100				(0)	

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4	2.24	3	2.24	100	100	0	70	100	100
4	2.24	3	2.24	(0)	(100)	0	(100)	90	
4	2.24	3	8.96	(0)	(100)	5	70		
4	2.24	3	8.96	(0)	(92)				100
4	2.24	3	8.96	90	100	10	90		(0)
4	2.24	3	8.96	(10)	(5)	0	(88)	70	
4	.56	4	.56	(0)	(100)	0	(100)	70	
4	.56	4	2.24	(0)	(100)	0	(100)	70	
4	.56	4	8.96	(0)	(100)	0	(100)	70	
4	2.24	4	.56	(0)	(100)	10	90		
4	2.24	4	2.24	(0)	(88)	15	90		
4	2.24	4	8.96	(0)	(83)	5	90		
4	.56	5	.56	(5)	(94)	30	75		
4	.56	5	2.24	(0)	(60)	15	75		
4	.56	5	8.96	(0)	(80)	15	75		
4	2.24	5	.56	(0)	(80)	35	95		
4	2.24	5	2.24	(0)	(63)	10	95		
4	2.24	5	8.96	(0)	(89)	10	95		
4	.56	13	.56	(0)	(89)	5	85		
4	.56	13	2.24	(0)	(94)	5	85		
4	.56	13	8.96	(0)	(94)	0	85		
4	2.24	13	.56	(0)	(100)	65	95		
4	2.24	13	2.24	(0)	(31)	10	95		
4	2.24	13	8.96	(0)	(89)	5	95		
4	.56	20	.56	(0)	(94)				100
4	.56	20	.56	(38)		20	65		(0)
4	.56	20	2.24		(69)	55	65		
4	.56	20	2.24	40	(15)				100
				97					100

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4	.56	20	8.96	(58)	100	100	20	65	(0)
4	.56	20	8.96	10	(0)	100	(69)	100	100
4	2.24	20	.56	85	(89)	100		100	(0)
4	2.24	20	.56	(15)	100	100	30	70	(0)
4	2.24	20	2.24	60	(40)	(0)	(57)	100	100
4	2.24	20	2.24			100	70	70	(0)
4	2.24	20	8.96			(0)	(0)	70	
4	2.24	20	8.96	60	(40)	(0)	(64)		
10	2.24	1	.56			100	30	95	(0)
10	2.24	1	2.24			(0)	(68)	95	
10	2.24	1	8.96			(0)	(47)	95	
10	8.96	1	.56			100	90	85	
10	8.96	1	2.24			(0)	(0)	85	
10	8.96	1	8.96			(0)	(52)	85	
10	2.24	3	.56			(0)	(64)	95	
10	2.24	3	2.24			(0)	(89)	95	
10	2.24	3	8.96			(0)	(89)	95	
10	8.96	3	.56			(0)	(94)	85	
10	8.96	3	2.24			(0)	(82)	85	
10	8.96	3	8.96			(0)	(11)	85	
10	2.24	20	.56			(0)	(29)	95	
10	2.24	20	2.24			(0)	(73)	95	
10	2.24	20	8.96			(0)	(52)	95	
10	8.96	20	.56			(0)	(68)	85	
10	8.96	20	2.24			(0)	(0)	85	
10	8.96	20	8.96			(0)	(0)	85	
10	8.96	20	8.96			(0)	(0)	85	

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11	.56	1	.56	40	93	100	100	100	100
					(56)	(0)	(0)	(0)	(0)
11	.56	1	2.24	60	93	100	100	100	100
11	.56	1	8.96	0	93	95	100	100	100
					(100)	(5)	(5)	(5)	(5)
11	2.24	1	.56			100	100	20	60
						(0)	(66)		
11	2.24	1	.56	95	98	100	100		100
					(3)	(0)	(0)		(0)
11	2.24	1	2.24	85	98	100	100		100
					(13)	(0)	(0)		(0)
11	2.24	1	2.24			100	100	35	60
						(0)	(41)		
11	2.24	1	8.96			100	100	60	60
						(0)	(0)		(0)
11	2.24	1	8.96	90	98	100	100		100
					(8)	(0)	(0)		(0)
11	8.96	1	.56			100	100	30	97
						(0)	(69)		
11	8.96	1	2.24			100	100	65	97
						(0)	(32)		
11	8.96	1	8.96			100	100	35	97
						(0)	(63)		
11	.56	3	.56	50	93	100	100		100
					(46)	(0)	(0)		(0)
11	.56	3	2.24	40	93	100	100		100
					(56)	(0)	(0)		(0)
11	.56	3	8.96	60	93	95	100		100
					(35)	(5)	(5)		(5)
11	2.24	3	.56	95	98	100	100		100
					(3)	(0)	(0)		(0)
11	2.24	3	.56			100	100	0	60
						(0)	(100)		
11	2.24	3	2.24			100	100	0	60
						(0)	(100)		
11	2.24	3	2.24	95	98	100	100		100
					(3)	(0)	(0)		(0)
11	2.24	3	8.96			100	100	0	60
						(0)	(100)		
11	2.24	3	8.96	95	98	100	100		100
					(3)	(0)	(0)		(0)
11	8.96	3	.56			100	100	0	97
						(0)	(100)		
11	8.96	3	2.24			100	100	5	97
						(0)	(94)		
11	8.96	3	8.96			100	100	0	97
						(0)	(100)		
11	.56	20	.56	60	93	100	100		100
					(35)	(0)	(0)		(0)
11	.56	20	2.24	40	93	100	100		100
					(56)	(0)	(0)		(0)
11	.56	20	8.96	40	93	95	100		100
						(0)	(0)		(0)

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11	2.24	20	.56	85	(56)	98	100	100	(5)	100	100
11	2.24	20	.56		(13)		100	100	(0)		60
11	2.24	20	2.24	85		98	100	100	(0)	100	100
11	2.24	20	2.24		(13)		100	100	(0)		60
11	2.24	20	8.96				100	100	(0)		60
11	2.24	20	8.96	75		98	100	100	(0)	100	100
11	8.96	20	.56		(23)		100	100	(0)		97
11	8.96	20	2.24				100	100	(0)		70
11	8.96	20	8.96				100	100	(0)		75
11	8.96	20	8.96				100	100	(0)		45
5	.03	3	.56				60	95			(53)
5	.03	3	2.24				(36)	95			
5	.03	3	8.96				95	95			
5	.07	3	.56				30	95			
5	.07	3	2.24				(68)	100			
5	.07	3	8.96				100	100			
5	.07	3	8.96				80	100			
5	.03	13	.56				(20)	100			
5	.03	13	2.24				100	100			
5	.03	13	8.96					95			
5	.07	13	.56				95	95			
5	.07	13	2.24				(0)	100			
5	.07	13	8.96				95	95			
5	.07	13	8.96				(5)	100			
5	.07	13	8.96				95	100			
5	.07	13	8.96				(5)	100			
5	.07	13	8.96				95	100			
12	.56	1	.56	60		65	100	100			
12	.56	1	2.24	65	(7)	65	100	100			
12	.56	1	8.96	55	(0)	65	100	100			
12	2.24	1	.56	100	(15)	100	100	100			
12	2.24	1	.56		(0)		100	100			

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12	2.24	1	2.24	100	100	100	100
12	2.24	1	2.24	(0)	(0)	72	(0)
12	2.24	1	8.96		100	(0)	72
12	2.24	1	8.96	95	100		100
12	4.48	1	.56	(5)	100	80	(0)
12	4.48	1	2.24		100	85	(5)
12	4.48	1	8.96		100	90	85
12	.56	3	.56	65	100	85	(0)
12	.56	3	2.24	50	100		(0)
12	.56	3	8.96	95	(23)	85	100
12	2.24	3	.56	95	(0)		100
12	2.24	3	.56	(5)			(0)
12	2.24	3	2.24	100	100	70	72
12	2.24	3	2.24	(0)	(0)	(2)	(90)
12	2.24	3	8.96		100	85	72
12	2.24	3	8.96	95	100		(0)
12	4.48	3	.56	(5)	100	75	85
12	4.48	3	2.24		100	85	(11)
12	4.48	3	8.96		100	70	(5)
12	.56	20	.56	30	65		(17)
12	.56	20	2.24	65	(53)		
12	.56	20	8.96	55	(0)		
12	2.24	20	.56	(15)			
12	2.24	20	.56	95	100	80	72
12	2.24	20	2.24	(5)	(0)	(0)	(0)
12	2.24	20	2.24		100	75	72
12	2.24	20	2.24	95	100		(0)
12	2.24	20	8.96	(5)			72

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12	2.24	20	8.96	85	100	(0)	(0)	100	100
12	4.48	20	.56	(15)	100	100	80	85	(0)
12	4.48	20	2.24		100	(0)	80	85	(5)
12	4.48	20	8.96		100	(0)	85	85	(5)
					(0)	(0)	(0)	(0)	(0)

TABLE 4-continued

% PLANT INHIBITION AND % SAFENING EFFECT ()														
HERB. NO.	RATE	ANTIDOTE		Foxtail Crabgrass Barnyard										
		NO.	RATE	Sorghum		Green		Large		Grass		Corn		
				W	WO	W	WO	W	WO	W	WO	W	WO	
2	.56	1	2.24	13	(93) 95	100	100			100	100			
2	.56	1	2.24	5	(86) 78	100	(0)	100		100	(0)	95		
2	.56	1	2.24	13	(93) 90	85	(0)	95		100	(0)	100		
2	.56	1	2.24	23	(85) 90	100	(10)	100		100	(0)	95		
2	1.12	1	.03	83	(74) 95	100	(0)	100		100	(0)	100		
2	1.12	1	.03	83	(12) 65	100	(0)	100		100	(0)	100		
2	1.12	1	.07	28	(0) 95	100	(0)	100		100	(0)	100		
2	1.12	1	.14	33	(70) 65	100	(0)	100		100	(0)	100		
2	1.12	1	.14	8	(49) 98	100	(0)	100		100	(0)	100		
2	1.12	1	.14	28	(91) 90	100	(0)	100		100	(0)	100		
2	1.12	1	.14	33	(68) 95	95	(0)	98		100	(0)	100		
2	1.12	1	.14	43	(65) 95	100	(3)	100		100	(0)	100		
2	1.12	1	.14	28	(54) 95	95	(0)	95		100	(0)	100		
2	1.12	1	.14	40	(70) 95	100	(0)	100		100	(0)	100		
2	1.12	1	.14	8	(57) 85		(0)				(0)			
2	1.12	1	.14	20	(90) 85									
2	1.12	1	.14	53	(76) 93	100	(0)	100		100	(0)	100		
2	1.12	1	.14	28	(43) 95	100	(0)	100		100	(0)	100		
2	1.12	1	.56	8	(70) 85		(0)				(0)			
2	1.12	1	.56	8	(90) 95	100	(0)	100		100	(0)	100		
2	1.12	1	.56	13	(91) 85		(0)				(0)			
2	1.12	1	.56	18	(84) 95	100	(0)	100		100	(0)	100		
2	1.12	1	.56	13	(81) 90	100	(0)	100		100	(0)	100		
2	1.12	1	.56	5	(85) 98	100	(0)	100		98	(0)	100		
2	1.12	1	.56	33	(94) 95	100	(0)	100		100	(2)	100		
2	1.12	1	.56	43	(65) 100	100	(0)	100		100	(0)	100		
2	1.12	1	.56	25	(57) 65	100	(0)	100		100	(0)	100		
2	1.12	1	.56	25	(61) 95	100	(0)	95		100	(0)	100		
2	1.12	1	.56	18	(73) 95	95	(0)	98		100	(0)	100		
2	1.12	1	.56	30	(81) 93	100	(3)	100		100	(0)	100		
2	1.12	1	1.12	53	(67) 100	100	(0)	100		100	(0)	100		
2	1.12	1	2.24	8	(47) 95	100	(0)	100		100	(0)	100		
2	1.12	1	2.24	28	(91) 93	100	(0)	100		100	(0)	100		
2	1.12	1	2.24	5	(69) 90	100	(0)	100		100	(0)	100		
2	1.12	1	2.24	18	(94) 95	95	(0)	95		95	(0)	100		
2	1.12	1	2.24	5	(81) 85		(0)				(5)			
2	1.12	1	2.24	5	(94) 98	100	(0)	100		98	(2)	100		
2	1.12	1	2.24	70	(94) 100	100	(0)	100		100	(0)	100		
					(30)		(0)				(0)			

TABLE 4-continued

% PLANT INHIBITION AND % SAFENING EFFECT ()														
HERB. NO.	RATE	ANTIDOTE		Foxtail Crabgrass Barnyard										
		NO.	RATE	Sorghum		Green		Large		Grass		Corn		
				W	WO	W	WO	W	WO	W	WO	W	WO	
2	1.12	1	2.24	35	95	98	98				100	100		
					(63)		(0)					(0)		
2	1.12	1	2.24	20	85									
					(76)									
2	2.24	1	.03	85	90	100	100				100	100		
					(5)		(0)					(0)		
2	2.24	1	.03	95	97	100	100				100	100		
					(2)		(0)					(0)		
2	2.24	1	.07	60	99	100	100				100	100		
					(39)		(0)					(0)		
2	2.24	1	.14	93	97	100	100				100	100		
					(4)		(0)					(0)		
2	2.24	1	.14	70	98	100	100				98	100		
					(28)		(0)					(2)		
2	2.24	1	.14	38	98	98	98				100	100		
					(61)		(0)					(0)		
2	2.24	1	.14	75	99	100	100				100	100		
					(24)		(0)					(0)		
2	2.24	1	.14	40	95	95	100				100	100		
					(57)		(5)					(0)		
2	2.24	1	.14	73	97	100	100				100	100		
					(24)		(0)					(0)		
2	2.24	1	.14	40	97	100	100				100	100		
					(58)		(0)					(0)		
2	2.24	1	.14	18	93	98	100				100	100		
					(80)		(2)					(0)		
2	2.24	1	.14	33	78									
					(57)									
2	2.24	1	.14	55	90	100	100				100	100		
					(38)		(0)					(0)		
2	2.24	1	.14	35	90									
					(61)									
2	2.24	1	.56	78	90	100	100				100	100		
					(13)		(0)					(0)		
2	2.24	1	.56	20	98	100	100				100	100		
					(79)		(0)					(0)		
2	2.24	1	.56	33	98	100	98				100	100		
					(66)		(0)					(0)		
2	2.24	1	.56	33	90									
					(63)									
2	2.24	1	.56	15	97	100	100				100	100		
					(84)		(0)					(0)		
2	2.24	1	.56	23	95	100	100				100	100		
					(75)		(0)					(0)		
2	2.24	1	.56	75	97	100	100				100	100		
					(22)		(0)					(0)		
2	2.24	1	.56	38	97	100	100				100	100		
					(60)		(0)					(0)		
2	2.24	1	.56	5	78									
					(93)									
2	2.24	1	.56	93	100	100	100				100	100		
					(7)		(0)					(0)		
2	2.24	1	.56	8	93	100	100				100	100		
					(91)		(0)					(0)		
2	2.24	1	.56	13	99	100	100				100	100		
					(86)		(0)					(0)		
2	2.24	1	1.12	70	100	100	100				100	100		
					(30)		(0)					(0)		
2	2.24	1	2.24	63	100	100	100				100	100		
					(37)		(0)					(0)		
2	2.24	1	2.24	28	97	100	100				100	100		
					(71)		(0)					(0)		
2	2.24	1	2.24	0	78									
					(100)									
2	2.24	1	2.24	28	98	100	100				100	100		
					(71)		(0)					(0)		
2	2.24	1	2.24	33	93	100	100				100	100		
					(64)		(0)					(0)		
2	2.24	1	2.24	25	97	100	100				100	100		
					(74)		(0)					(0)		
2	2.24		2.24	40	95	100	100				100	100		
					(57)		(0)					(0)		
2	2.24	1	2.24	33	90									
					(63)									
2	2.24	1	2.24	28	98	100	98				100	100		
					(71)		(0)					(0)		
2	.56	2	.07	5	58	98	100				100	100		

TABLE 4-continued

% PLANT INHIBITION AND % SAFENING EFFECT ()													
HERB. NO.	RATE	ANTIDOTE NO.	RATE	Foxtail Crabgrass Barnyard									
				Sorghum		Green		Large		Grass		Corn	
				W	WO	W	WO	W	WO	W	WO	W	WO
2	.56	2	.14	(91)	15	58	100	100			(0)	100	100
2	.56	2	.14	(74)	13	77	100	100			(0)	100	100
2	.56	2	.14	(83)	35	95	100	100			(0)	100	100
2	.56	2	.14	(63)	38	87	100	100			(0)	100	100
2	.56	2	.14	(56)	5	92	100	100			(0)	100	100
2	.56	2	.14	(94)	33	90	95	100			(0)	95	95
2	.56	2	.56	(63)	10	58	100	100			(0)	100	100
2	.56	2	.56	(82)	5	77	100	100			(0)	100	100
2	.56	2	.56	(93)	30	87	98	100			(0)	100	100
2	.56	2	.56	(65)	13	95	100	100			(0)	100	100
2	.56	2	.56	(86)	43	92	100	100			(0)	100	100
2	.56	2	.56	(53)	15	90	95	100			(0)	100	95
2	.56	2	2.24	(83)	8	77	100	100			(0)	100	100
2	.56	2	2.24	(89)	18	87	98	100			(0)	100	100
2	.56	2	2.24	(79)	15	95	100	100			(0)	100	100
2	.56	2	2.24	(84)	58	92	100	100			(0)	100	100
2	.56	2	2.24	(36)	33	90	98	100			(0)	95	95
2	1.12	2	.07	(63)	13	72	100	98			(0)	100	100
2	1.12	2	.14	(81)	5	90	100	100			(0)	100	100
2	1.12	2	.14	(94)	23	72	100	98			(0)	100	100
2	1.12	2	.14	(68)	63	98	100	100			(0)	100	100
2	1.12	2	.14	(35)	48	100	100	100			(0)	100	100
2	1.12	2	.14	(52)	30	93	100	100			(0)	98	100
2	1.12	2	.14	(67)	20	95	100	100			(0)	100	100
2	1.12	2	.56	(78)	0	72	100	98			(0)	100	100
2	1.12	2	.56	(100)	10	90	100	100			(0)	100	100
2	1.12	2	.56	(88)	18	93	100	100			(0)	100	100
2	1.12	2	.56	(80)	70	98	100	100			(0)	100	100
2	1.12	2	.56	(28)	45	95	100	100			(0)	100	100
2	1.12	2	.56	(52)	23	100	100	100			(0)	100	100
2	1.12	2	2.24	(77)	0	90	100	100			(0)	100	100
2	1.12	2	2.24	(100)	45	100	100	100			(0)	100	100
2	1.12	2	2.24	(55)	35	98	100	100			(0)	100	100
2	1.12	2	2.24	(64)	33	93	100	100			(0)	100	100
2	1.12	2	2.24	(64)	30	95	100	100			(0)	100	100
2	2.24	2	.07	(68)	60	97	100	100			(0)	100	100
2	2.24	2	.14	(38)	25	97	100	100			(0)	100	100
2	2.24	2	.14	(74)	45	97	100	100			(0)	100	100
2	2.24	2	.14	(53)							(0)		

TABLE 4-continued

% PLANT INHIBITION AND % SAFENING EFFECT ()														
HERB.	ANTIDOTE			Foxtail Crabgrass Barnyard										
	NO.	RATE	NO.	RATE	Sorghum		Green		Large		Grass		Corn	
					W	WO	W	WO	W	WO	W	WO	W	WO
2	2.24	2	.14	25	98	100	100				100	100		
				(74)		(0)					(0)			
2	2.24	2	.14	78	97	100	100				100	100		
				(19)		(0)					(0)			
2	2.24	2	.14	88	98	100	100				100	100		
				(10)		(0)					(0)			
2	2.24	2	.14	53	100	100	100				100	100		
				(47)		(0)					(0)			
2	2.24	2	.56	23	97	100	100				100	100		
				(76)		(0)					(0)			
2	2.24	2	.56	8	97	100	100				100	100		
				(33)		(0)					(0)			
2	2.24	2	.56	23	97	100	100				100	100		
				(76)		(0)					(0)			
2	2.24	2	.56	63	100	100	100				100	100		
				(37)		(0)					(0)			
2	2.24	2	.56	43	98	100	100				100	100		
				(56)		(0)					(0)			
2	2.24	2	2.24	25	97	100	100				100	100		
				(74)		(0)					(0)			
2	2.24	2	2.24	45	100	100	100				100	100		
				(55)		(0)					(0)			
2	2.24	2	2.24	15	97	100	100				100	100		
				(84)		(0)					(0)			
2	2.24	2	2.24	25	98	100	100				100	100		
				(74)		(0)					(0)			
2	2.24	2	2.24	58	98	100	100				100	100		
				(40)		(0)					(0)			
2	.56	3	.03	60	37	98	100				100	100		
				(0)		(2)					(2)			
2	.56	3	.03	35	87	100	100				100	100		
				(59)		(0)					(0)			
2	.56	3	.04	5	88	98	100				95	100		
				(94)		(2)					(5)			
2	.56	3	.07	43	95	98	100				100	100		
				(54)		(2)					(0)			
2	.56	3	.07	45	58	98	100				100	100		
				(22)		(2)					(0)			
2	.56	3	.14	15	77	100	100				100	100		
				(80)		(0)					(0)			
2	.56	3	.14	8	88	98	100				98	100		
				(90)		(0)					(0)			
2	.56	3	.14	25	37	100	100				98	100		
				(32)		(0)					(2)			
2	.56	3	.14	30	87	100	100				100	100		
				(65)		(0)					(0)			
2	.56	3	.14	38	95	100	100				100	100		
				(60)		(0)					(0)			
2	.56	3	.14	23	58	100	100				100	100		
				(60)		(0)					(0)			
2	.56	3	.14	68	95	100	100				100	100		
				(28)		(0)					(0)			
2	.56	3	.14	10	92	100	100				100	100		
				(89)		(0)					(0)			
2	.56	3	.14	33	87	100	100				100	100		
				(62)		(0)					(0)			
2	.56	3	.14	13	90	95	100				100	95		
				(85)		(5)					(0)			
2	.56	3	.56	13	37	100	100				100	100		
				(64)		(0)					(0)			
2	.56	3	.56	15	58	100	100				100	100		
				(74)		(0)					(0)			
2	.56	3	.56	0	88	100	100				100	100		
				(100)		(0)					(0)			
2	.56	3	.56	0	77	100	100				100	100		
				(100)		(0)					(0)			
2	.56	3	.56	13	95	100	100				100	100		
				(86)		(0)					(0)			
2	.56	3	.56	20	87	100	100				100	100		
				(77)		(0)					(0)			
2	.56	3	.56	40	90	98	100				95	95		
				(55)		(2)					(0)			
2	.56	3	.56	15	95	100	100				100	100		
				(84)		(0)					(0)			
2	.56	3	.56	13	92	100	100				100	100		
				(85)		(0)					(0)			
2	.56	3	.56	28	87	100	100				100	100		

TABLE 4-continued

% PLANT INHIBITION AND % SAFENING EFFECT ()													
HERB. NO.	RATE	ANTIDOTE		Foxtail Crabgrass Barnyard									
		NO.	RATE	Sorghum		Green		Large		Grass		Corn	
				W	WO	W	WO	W	WO	W	WO	W	WO
2	.56	3	2.24	(67)		(0)					(0)		
				5	77	100	100				100	100	
2	.56	3	2.24	(93)		(0)					(0)		
				43	95	98	100				95	100	
2	.56	3	2.24	(54)		(2)					(5)		
				8	90	95	100				95	95	
2	.56	3	2.24	(91)		(5)					(0)		
				0	87	98	100				100	100	
2	.56	3	2.24	(100)		(2)					(0)		
				8	92	100	100				100	100	
2	1.12	3	.03	(91)		(0)					(0)		
				40	65	100	100				100	100	
2	1.12	3	.03	(38)		(0)					(0)		
				70	95	100	100				100	100	
2	1.12	3	.04	(26)		(0)					(0)		
				23	87	100	100				100	100	
2	1.12	3	.07	(73)		(0)					(0)		
				40	72	100	98				100	100	
2	1.12	3	.07	(44)		(0)					(0)		
				43	95	100	100				100	100	
2	1.12	3	.14	(54)		(0)					(0)		
				90	65	98	100				98	100	
2	1.12	3	.14	(0)		(2)					(2)		
				8	90	100	100				100	100	
2	1.12	3	.14	(91)		(0)					(0)		
				50	95	100	100				100	100	
2	1.12	3	.14	(47)		(0)					(0)		
				43	95	100	100				100	100	
2	1.12	3	.14	(54)		(0)					(0)		
				28	87	100	100				100	100	
2	1.12	3	.14	(67)		(0)					(0)		
				15	72	100	98				100	100	
2	1.12	3	.14	(79)		(0)					(0)		
				25	95	100	100				100	100	
2	1.12	3	.14	(73)		(0)					(0)		
				55	93	100	100				100	100	
2	1.12	3	.14	(40)		(0)					(0)		
				33	98	100	100				98	100	
2	1.12	3	.14	(66)		(0)					(2)		
				65	100	100	100				100	100	
2	1.12	3	.56	(35)		(0)					(0)		
				60	65	100	100				100	100	
2	1.12	3	.56	(7)		(0)					(0)		
				15	87	100	100				100	100	
2	1.12	3	.56	(82)		(0)					(0)		
				15	72	100	98				100	100	
2	1.12	3	.56	(79)		(0)					(0)		
				70	95	100	100				100	100	
2	1.12	3	.56	(26)		(0)					(0)		
				20	90	100	100				100	100	
2	1.12	3	.56	(77)		(0)					(0)		
				15	95	100	100				100	100	
2	1.12	3	.56	(84)		(0)					(0)		
				23	98	100	100				100	100	
2	1.12	3	.56	(76)		(0)					(0)		
				38	93	100	100				95	100	
2	1.12	3	.56	(59)		(0)					(5)		
				75	100	100	100				100	100	
2	1.12	3	.56	(25)		(0)					(0)		
				15	95	100	100				98	100	
2	1.12	3	2.24	(84)		(0)					(2)		
				20	90	100	100				100	100	
2	1.12	3	2.24	(77)		(0)					(0)		
				28	100	100	100				100	100	
2	1.12	3	2.24	(72)		(0)					(0)		
				15	95	100	100				100	100	
2	1.12	3	2.24	(84)		(0)					(0)		
				35	93	100	100				100	100	
2	1.12	3	2.24	(62)		(0)					(0)		
				15	98	98	100				100	100	
2	2.24	3	.03	(84)		(2)					(0)		
				90	90	98	100				100	100	
2	2.24	3	.03	(0)		(2)					(0)		
				93	97	100	100				100	100	
2	2.24	3	.04	(4)		(0)					(0)		
				25	60	100	100				100	100	
				(58)		(0)					(0)		

TABLE 4-continued

% PLANT INHIBITION AND % SAFENING EFFECT ()													
HERB. NO.	RATE	ANTIDOTE		Foxtail Crabgrass Barnyard									
		NO.	RATE	Sorghum		Green		Large		Grass		Corn	
				W	WO	W	WO	W	WO	W	WO	W	WO
2	2.24	3	.07	95	99	100	100			100	100		
				(4)		(0)				(0)			
2	2.24	3	.07	68	97	100	100			100	100		
				(29)		(0)				(0)			
2	2.24	3	.14	63	97	100	100			100	100		
				(35)		(0)				(0)			
2	2.24	3	.14	88	90	100	100			100	100		
				(2)		(0)				(0)			
2	2.24	3	.14	45	99	100	100			100	100		
				(54)		(0)				(0)			
2	2.24	3	.14	45	60	100	100			100	100		
				(25)		(0)				(0)			
2	2.24	3	.14	63	97	98	100			100	100		
				(35)		(2)				(0)			
2	2.24	3	.14	53	97	100	100			100	100		
				(45)		(0)				(0)			
2	2.24	3	.14	35	98	100	100			100	100		
				(64)		(0)				(0)			
2	2.24	3	.14	85	97	100	100			100	100		
				(12)		(0)				(0)			
2	2.24	3	.14	50	100	100	100			100	100		
				(50)		(0)				(0)			
2	2.24	3	.14	80	98	100	100			100	100		
				(18)		(0)				(0)			
2	2.24	3	.56	33	97	100	100			100	100		
				(65)		(0)				(0)			
2	2.24	3	.56	35	90	100	100			100	100		
				(61)		(0)				(0)			
2	2.24	3	.56	25	60	100	100			100	100		
				(58)		(0)				(0)			
2	2.24	3	.56	63	97	100	100			100	100		
				(35)		(0)				(0)			
2	2.24	3	.56	53	99	100	100			100	100		
				(46)		(0)				(0)			
2	2.24	3	.56	20	97	100	100			100	100		
				(79)		(0)				(0)			
2	2.24	3	.56	73	100	100	100			100	100		
				(27)		(0)				(0)			
2	2.24	3	.56	78	98	100	100			100	100		
				(20)		(0)				(0)			
2	2.24	3	.56	35	98	100	100			100	100		
				(64)		(0)				(0)			
2	2.24	3	.56	55	97	100	100			98	100		
				(43)		(0)				(2)			
2	2.24	3	2.24	20	97	100	100			100	100		
				(79)		(0)				(0)			
2	2.24	3	2.24	25	98	100	100			100	100		
				(74)		(0)				(0)			
2	2.24	3	2.24	55	100	100	100			100	100		
				(45)		(0)				(0)			
2	2.24	3	2.24	55	98	100	100			100	100		
				(43)		(0)				(0)			
2	2.24	3	2.24	80	97	100	100			100	100		
				(17)		(0)				(0)			
2	.56	4	.14	58	95	100	100			100	100		
				(38)		(0)				(0)			
2	.56	4	.14	33	90	100	100			98	95		
				(63)		(0)				(0)			
2	.56	4	.56	48	95	100	100			98	100		
				(49)		(0)				(2)			
2	.56	4	.56	20	90	100	100			98	95		
				(77)		(0)				(0)			
2	.56	4	2.24	20	95	98	100			100	100		
				(78)		(2)				(0)			
2	.56	4	2.24	28	90	100	100			95	95		
				(68)		(0)				(0)			
2	1.12	4	.14	60	100	100	100			100	100		
				(40)		(0)				(0)			
2	1.12	4	.14	33	93	98	100			98	100		
				(64)		(2)				(2)			
2	1.12	4	.56	63	100	100	100			100	100		
				(37)		(0)				(0)			
2	1.12	4	.56	30	93	100	100			100	100		
				(67)		(0)				(0)			
2	1.12	4	2.24	50	100	100	100			100	100		
				(50)		(0)				(0)			
2	1.12	4	2.24	63	93	100	100			100	100		

TABLE 4-continued

% PLANT INHIBITION AND % SAFENING EFFECT ()													
HERB. NO.	RATE	ANTIDOTE		Foxtail Crabgrass Barnyard									
		NO.	RATE	Sorghum		Green		Large		Grass		Corn	
				W	WO	W	WO	W	WO	W	WO	W	WO
2	.56	6	2.24	60	95	100	100					100	100
				(36)		(0)						(0)	
2	1.12	6	.14	63	93	100	100					100	100
				(32)		(0)						(0)	
2	1.12	6	.14	50	100	100	100					100	100
				(50)		(0)						(0)	
2	1.12	6	.56	55	100	100	100					100	100
				(45)		(0)						(0)	
2	1.12	6	.56	20	93	100	100					100	100
				(78)		(0)						(0)	
2	1.12	6	2.24	58	93	100	100					98	100
				(37)		(0)						(2)	
2	1.12	6	2.24	28	100	100	100					100	100
				(72)		(0)						(0)	
2	2.24	6	.14	73	100	100	100					100	100
				(27)		(0)						(0)	
2	2.24	6	.14	60	97	100	100					100	100
				(38)		(0)						(0)	
2	2.24	6	.56	80	100	100	100					100	100
				(20)		(0)						(0)	
2	2.24	6	.56	40	97	100	100					100	100
				(58)		(0)						(0)	
2	2.24	6	2.24	45	97	100	100					100	100
				(53)		(0)						(0)	
2	2.24	6	2.24	60	100	100	100					100	100
				(40)		(0)						(0)	
2	.56	27	.14	78	92	100	100					100	100
				(15)		(0)						(0)	
2	.56	27	.56	30	92	100	100					100	100
				(67)		(0)						(0)	
2	.56	27	2.24	18	92	100	100					100	100
				(80)		(0)						(0)	
2	1.12	27	.14	88	95	100	100					100	100
				(7)		(0)						(0)	
2	1.12	27	.56	55	95	100	100					100	100
				(42)		(0)						(0)	
2	1.12	27	2.24	10	95	100	100					98	100
				(89)		(0)						(2)	
2	2.24	27	.14	88	98	100	100					100	100
				(10)		(0)						(0)	
2	2.24	27	.56	83	98	100	100					100	100
				(15)		(0)						(0)	
2	2.24	27	2.24	50	98	100	100					100	100
				(48)		(0)						(0)	
2	.56	7	.14	10	92	100	100					100	100
				(89)		(0)						(0)	
2	.56	7	.56	13	92	98	100					100	100
				(85)		(2)						(0)	
2	.56	7	2.24	10	92	100	100					100	100
				(89)		(0)						(0)	
2	1.12	7	.14	33	95	100	100					100	100
				(65)		(0)						(0)	
2	1.12	7	.56	30	95	100	100					100	100
				(68)		(0)						(0)	
2	1.12	7	2.24	15	95	100	100					98	100
				(84)		(0)						(2)	
2	2.24	7	.14	83	98	100	100					100	100
				(15)		(0)						(0)	
2	2.24	7	.56	20	98	100	100					100	100
				(79)		(0)						(0)	
2	2.24	7	2.24	20	98	100	100					100	100
				(79)		(0)						(0)	
2	.56	8	.14	20	92	100	100					95	100
				(78)		(0)						(5)	
2	.56	8	.56	13	92	100	100					98	100
				(85)		(0)						(2)	
2	.56	8	2.24	5	92	100	100					100	100
				(94)		(0)						(0)	
2	1.12	8	.14	5	95	100	100					100	100
				(94)		(0)						(0)	
2	1.12	8	.56	28	95	100	100					100	100
				(70)		(0)						(0)	
2	1.12	8	2.24	60	95	100	100					100	100
				(36)		(0)						(0)	
2	2.24	8	.14	33	98	100	100					100	100
				(66)		(0)						(0)	
2	2.24	8	.56	20	89	100	100					100	100

TABLE 4-continued

% PLANT INHIBITION AND % SAFENING EFFECT ()													
HERB. NO.	RATE	ANTIDOTE NO.	RATE	Foxtail Crabgrass Barnyard									
				Sorghum		Green		Large		Grass		Corn	
				W	WO	W	WO	W	WO	W	WO	W	WO
2	2.24	8	2.24	(79) 25	98	(0) 98	100			(0) 100	100		
2	.56	9	.07	(74) 23	58	(2) 100	100			(0) 100	100		
2	.56	9	.14	(60) 38	58	(0) 100	100			(0) 100	100		
2	.56	9	.14	(34) 0	77	(0) 100	100			(0) 100	100		
2	.56	9	.56	(100) 15	58	(0) 100	100			(0) 100	100		
2	.56	9	.56	(74) 10	77	(0) 100	100			(0) 100	100		
2	.56	9	2.24	(87) 10	77	(0) 100	100			(0) 100	100		
2	1.12	9	.07	(87) 30	72	(0) 100	98			(0) 100	100		
2	1.12	9	.14	(58) 13	90	(0) 100	100			(0) 100	100		
2	1.12	9	.14	(85) 18	72	(0) 100	98			(0) 100	100		
2	1.12	9	.56	(75) 15	90	(0) 100	100			(0) 100	100		
2	1.12	9	.56	(83) 25	72	(0) 100	98			(0) 100	100		
2	1.12	9	2.24	(65) 5	90	(0) 100	100			(0) 100	100		
2	2.24	9	.07	(94) 63	97	(0) 100	100			(0) 100	100		
2	2.24	9	.14	(35) 53	97	(0) 100	100			(0) 100	100		
2	2.24	9	.14	(45) 25	97	(0) 100	100			(0) 100	100		
2	2.24	9	.56	(74) 25	97	(0) 100	100			(0) 100	100		
2	2.24	9	.56	(74) 33	97	(0) 100	100			(0) 100	100		
2	2.24	9	2.24	(65) 5	97	(0) 100	100			(0) 100	100		
2	.56	20	.03	(94) 25	87	(0) 100	100			(0) 100	100		
2	.56	20	.04	(71) 23	88	(0) 95	100			(0) 100	100		
2	.56	20	.07	(73) 5	58	(5) 100	100			(0) 100	100		
2	.56	20	.07	(91) 23	95	(0) 100	100			(0) 100	100		
2	.56	20	.14	(75) 23	95	(0) 95	100			(0) 100	100		
2	.56	20	.14	(75) 5	77	(5) 100	100			(0) 100	100		
2	.56	20	.14	(93) 35	58	(0) 100	100			(0) 100	100		
2	.56	20	.14	(39) 15	87	(0) 100	100			(0) 100	100		
2	.56	20	.14	(82) 8	88	(0) 100	100			(0) 100	100		
2	.56	20	.56	(90) 10	88	(0) 98	100			(0) 100	100		
2	.56	20	.56	(88) 5	77	(2) 100	100			(0) 100	100		
2	.56	20	.56	(93) 0	95	(0) 98	100			(0) 100	100		
2	.56	20	.56	(100) 10	87	(2) 100	100			(0) 100	100		
2	.56	20	.56	(88) 0	58	(0) 100	100			(0) 100	100		
2	.56	20	2.24	(100) 15	77	(0) 100	100			(0) 100	100		
2	1.12	20	.03	(80) 63	95	(0) 100	100			(0) 100	100		
2	1.12	20	.04	(33) 40	87	(0) 100	100			(0) 100	100		
2	1.12	20	.07	(54) 20	72	(0) 100	98			(0) 100	100		
2	1.12	20	.07	(72) 53	95	(0) 100	100			(0) 100	100		
				(44) (0)		(0)				(0)			

TABLE 4-continued

% PLANT INHIBITION AND % SAFENING EFFECT ()														
HERB. NO.	RATE	ANTIDOTE		Foxtail Crabgrass Barnyard										
		NO.	RATE	Sorghum		Green		Large		Grass		Corn		
				W	WO	W	WO	W	WO	W	WO	W	WO	
2	1.12	20	.14	10	87	100	100				100	100		
					(88)		(0)					(0)		
2	1.12	20	.14	8	72	100	98				100	100		
					(88)		(0)					(0)		
2	1.12	20	.14	40	95	95	100				100	100		
					(57)		(5)					(0)		
2	1.12	20	.14	38	95	100	100				100	100		
					(60)		(0)					(0)		
2	1.12	20	.14	0	90	100	100				100	100		
					(100)		(0)					(0)		
2	1.12	20	.56	0	87	98	100				100	100		
					(100)		(2)					(0)		
2	1.12	20	.56	5	95	100	100				100	100		
					(94)		(0)					(0)		
2	1.12	20	.56	28	95	100	100				100	100		
					(70)		(0)					(0)		
2	1.12	20	.56	25	72	100	98				100	100		
					(65)		(0)					(0)		
2	1.12	20	.56	15	90	100	100				100	100		
					(83)		(0)					(0)		
2	1.12	20	2.24	13	90	100	100				100	100		
					(85)		(0)					(0)		
2	2.24	20	.03	65	97	100	100				100	100		
					(32)		(0)					(0)		
2	2.24	20	.04	43	60	100	100				98	100		
					(28)		(0)					(2)		
2	2.24	20	.07	30	97	100	100				100	100		
					(69)		(0)					(0)		
2	2.24	20	.07	83	99	100	100				100	100		
					(16)		(0)					(0)		
2	2.24	20	.14	25	97	100	100				100	100		
					(74)		(0)					(0)		
2	2.24	20	.14	18	97	100	100				100	100		
					(81)		(0)					(0)		
2	2.24	20	.14	58	97	100	100				100	100		
					(40)		(0)					(0)		
2	2.24	20	.14	38	99	100	100				100	100		
					(61)		(0)					(0)		
2	2.24	20	.14	35	60	100	100				100	100		
					(41)		(0)					(0)		
2	2.24	20	.56	18	97	100	100				100	100		
					(81)		(0)					(0)		
2	2.24	20	.56	25	99	100	100				100	100		
					(74)		(0)					(0)		
2	2.24	20	.56	25	60	100	100				100	100		
					(58)		(0)					(0)		
2	2.24	20	.56	53	97	100	100				100	100		
					(45)		(0)					(0)		
2	2.24	20	.56	28	97	100	100				100	100		
					(71)		(0)					(0)		
2	2.24	20	2.24	25	97	100	100				100	100		
					(74)		(0)					(0)		
2	.56	12	.03	28	87	100	100				100	100		
					(67)		(0)					(0)		
2	.56	12	.07	13	95	100	100				100	100		
					(86)		(0)					(0)		
2	.56	12	.14	17	87	100	100				100	100		
					(80)		(0)					(0)		
2	.56	12	.14	20	95	98	100				100	100		
					(78)		(2)					(0)		
2	.56	12	.56	5	87	100	100				100	100		
					(94)		(0)					(0)		
2	.56	12	.56	10	95	98	100				100	100		
					(89)		(2)					(0)		
2	1.12	12	.03	88	95	100	100				100	100		
					(7)		(0)					(0)		
2	1.12	12	.07	53	95	100	100				100	100		
					(44)		(0)					(0)		
2	1.12	12	.14	33	95	100	100				100	100		
					(65)		(0)					(0)		
2	1.12	12	.14	28	95	100	100				100	100		
					(70)		(0)					(0)		
2	1.12	12	.56	20	95	100	100				100	100		
					(78)		(0)					(0)		
2	1.12	12	.56	18	95	100	100				100	100		
					(81)		(0)					(0)		
2	2.24	12	.03	98	97	100	100				100	100		

TABLE 4-continued

% PLANT INHIBITION AND % SAFENING EFFECT ()													
Foxtail Crabgrass Barnyard													
HERB. NO.	RATE	ANTIDOTE		Sorghum		Green		Large		Grass		Corn	
		NO.	RATE	W	WO	W	WO	W	WO	W	WO	W	WO
2	2.24	12	.07	(0)	75 99	(0)	100 100			(0)	100 100		
2	2.24	12	.14	(24)	85 99	(0)	100 100			(0)	100 100		
2	2.24	12	.14	(14)	88 97	(0)	100 100			(0)	100 100		
2	2.24	12	.56	(9)	60 97	(0)	100 100			(0)	100 100		
2	2.24	12	.56	(38)	23 99	(0)	100 100			(0)	100 100		
2	.56	24	.03	(76)	18 37	(0)	100 100			(0)	100 100		
2	.56	24	.04	(51)	5 88	(0)	95 100			(0)	100 100		
2	.56	24	.14	(94)	15 88	(5)	95 100			(0)	100 100		
2	.56	24	.14	(82)	0 37	(5)	98 100			(0)	98 100		
2	.56	24	.56	(100)	0 37	(2)	98 100			(2)	98 100		
2	.56	24	.56	(100)	5 88	(2)	100 100			(2)	100 100		
2	.56	24	.56	(94)	5 88	(0)	100 100			(0)	100 100		
2	1.12	24	.03	(61)	25 65	(0)	100 100			(0)	100 100		
2	1.12	24	.04	(71)	25 87	(0)	100 100			(0)	100 100		
2	1.12	24	.14	(87)	8 65	(0)	100 100			(0)	98 100		
2	1.12	24	.14	(88)	10 87	(0)	100 100			(0)	100 100		
2	1.12	24	.56	(65)	30 87	(0)	100 100			(0)	100 100		
2	1.12	24	.56	(69)	20 65	(2)	98 100			(0)	100 100		
2	2.24	24	.03	(74)	23 90	(0)	100 100			(0)	100 100		
2	2.24	24	.04	(16)	50 60	(0)	100 100			(0)	100 100		
2	2.24	24	.14	(83)	10 60	(0)	100 100			(0)	100 100		
2	2.24	24	.14	(38)	55 90	(2)	98 100			(0)	100 100		
2	2.24	24	.56	(86)	8 60	(0)	100 100			(0)	100 100		
2	2.24	24	.56	(68)	28 90	(0)	100 100			(0)	100 100		
2	.56	26	.04	(79)	18 88	(0)	100 100			(0)	100 100		
2	.56	26	.14	(100)	0 88	(0)	100 100			(0)	100 100		
2	.56	26	.56	(82)	15 88	(2)	98 100			(0)	100 100		
2	1.12	26	.04	(77)	20 87	(0)	100 100			(2)	98 100		
2	1.12	26	.14	(90)	8 87	(0)	100 100			(0)	100 100		
2	1.12	26	.56	(85)	13 87	(2)	98 100			(0)	100 100		
2	2.24	26	.04	(25)	45 60	(0)	100 100			(0)	100 100		
2	2.24	26	.14	(58)	25 60	(0)	100 100			(0)	100 100		
2	2.24	26	.56	(86)	8 60	(0)	100 100			(0)	100 100		
2	.56	23	.04	(79)	18 88	(2)	98 100			(0)	10 100		
2	.56	23	.14	(88)	10 88	(0)	100 100			(0)	100 100		
2	.56	23	.56	(94)	5 88	(2)	98 100			(0)	98 100		
2	1.12	23	.04	(77)	20 87	(2)	98 100			(0)	100 100		
2	1.12	23	.14	(85)	13 87	(0)	100 100			(2)	98 100		
2	1.12	23	.56	(73)	23 87	(0)	100 100			(0)	100 100		

TABLE 4-continued

% PLANT INHIBITION AND % SAFENING EFFECT ()													
HERB. NO.	RATE	ANTIDOTE NO. RATE		Foxtail Crabgrass Barnyard									
				Sorghum		Green		Large		Grass		Corn	
				W	WO	W	WO	W	WO	W	WO	W	WO
2	2.24	23	.04	58	60	100	100			100	100		
				(3)		(0)				(0)			
2	2.24	23	.14	40	60	100	100			10	100		
				(33)		(0)				(0)			
2	2.24	23	.56	30	60	100	100			100	100		
				(50)		(0)				(0)			
13	4.48	2	.14			100	100			100	100	8	63
						(0)				(0)		(87)	
13	4.48	2	.56			10	100			100	100	15	63
						(0)				(0)		(76)	
13	4.48	2	2.24			100	100			100	100	5	63
						(0)				(0)		(92)	
13	6.72	2	.14			100	100			100	100	50	88
						(0)				(0)		(43)	
13	6.72	2	.56			100	100			100	100	28	88
						(0)				(0)		(68)	
13	6.72	2	2.24			100	100			100	100	25	88
						(0)				(0)		(71)	
13	8.96	2	.14			100	100			10	100	15	90
						(0)				(0)		(83)	
13	8.96	2	.56			100	100			100	10	13	90
						(0)				(0)		(85)	
13	8.96	2	2.24			100	100			100	100	15	90
						(0)				(0)		(83)	
13	4.48	3	.14			100	100			100	100	8	63
						(0)				(0)		(87)	
13	4.48	3	.14							100	100	0	53
										(0)		(100)	
13	4.48	3	.56							10	100	0	53
										(0)		(100)	
13	4.48	3	.56			10	100			100	100	5	63
						(0)				(0)		(92)	
13	4.48	3	2.24							100	100	5	53
										(0)		(90)	
13	4.48	3	2.24			100	100			100	100	5	63
						(0)				(0)		(92)	
13	6.72	3	.14			100	100			100	100	23	88
						(0)				(0)		(73)	
13	6.72	3	.14							100	100	5	70
										(0)		(92)	
13	6.72	3	.56							100	100	5	70
										(0)		(92)	
13	6.72	3	.56			100	100			100	100	20	88
						(0)				(0)		(77)	
13	6.72	3	2.24			100	100			100	100	23	88
						(0)				(0)		(73)	
13	6.72	3	2.24							100	100	5	70
										(0)		(92)	
13	8.96	3	.14							100	100	10	85
										(0)		(88)	
13	8.96	3	.14			100	100			100	100	13	90
						(0)				(0)		(85)	
13	8.96	3	.56							100	100	0	85
										(0)		(100)	
13	8.96	3	.56			100	100			100	100	13	90
						(0)				(0)		(85)	
13	8.96	3	2.24			10	100			100	100	8	90
						(0)				(0)		(91)	
13	8.96	3	2.24							100	100	0	85
										(0)		(100)	
13	4.48	20	.14			100	100			100	100	10	63
						(0)				(0)		(84)	
13	4.48	20	.14							100	100	5	53
										(0)		(90)	
13	4.48	20	.56							100	100	0	53
										(0)		(100)	
13	4.48	20	.56			100	100			10	100	28	63
						(0)				(0)		(55)	
13	4.48	20	2.24							10	100	0	53
										(0)		(100)	
13	4.48	20	2.24			100	100			100	100	18	63
						(0)				(0)		(71)	
13	6.72	20	.14							100	100	0	70
										(0)		(100)	
13	6.72	20	.14			100	100			100	100	25	88
						(0)				(0)		(71)	
13	6.72	20	.56			100	100			100	100	35	88

TABLE 4-continued

% PLANT INHIBITION AND % SAFENING EFFECT ()														
HERB. NO.	RATE	ANTIDOTE		Foxtail Crabgrass Barnyard										
		NO.	RATE	Sorghum		Green		Large		Grass		Corn		
				W	WO	W	WO	W	WO	W	WO	W	WO	
13	6.72	20	.56			(0)				(0)	100	100	0	70
13	6.72	20	2.24							(0)	100	100	0	70
13	6.72	20	2.24				10	100		(0)	100	100	23	88
13	8.96	20	.14				(0)	100		(0)	100	100	35	90
13	8.96	20	.14				(0)			(0)	100	100	5	85
13	8.96	20	.56							(0)	100	100	0	85
13	8.96	20	.56				10	100		(0)	10	100	28	90
13	8.96	20	2.24				(0)			(0)	10	100	0	85
13	8.96	20	2.24				100	100		(0)	10	100	30	90
13	4.48	24	.14				(0)			(0)	100	100	5	53
13	4.48	24	.56							(0)	100	100	5	53
13	4.48	24	2.24							(0)	10	100	0	53
13	6.72	24	.14							(0)	100	100	10	70
13	6.72	24	.56							(0)	100	100	5	70
13	6.72	24	2.24							(0)	100	100	10	70
13	8.96	24	.14							(0)	100	100	13	85
13	8.96	24	.56							(0)	100	100	5	85
13	8.96	24	2.24							(0)	100	100	5	85
4	1.12	1	.14				98	100		(0)	98	100	0	80
4	1.12	1	.56				(2)	100		(2)	100	100	10	80
4	1.12	1	2.24				(0)	100		(0)	100	100	0	80
4	2.24	1	.14				(0)	100		(0)	100	98	5	87
4	2.24	1	.56				(0)	100		(0)	100	98	0	87
4	2.24	1	2.24				(0)	100		(0)	100	98	0	87
4	4.48	1	.14				(0)	100		(0)	100	100	23	100
4	4.48	1	.56				(0)	100		(0)	100	100	0	100
4	4.48	1	2.24				(0)	100		(0)	100	100	0	100
4	1.12	2	.14				(0)	100	98		98	98	0	15
4	1.12	2	.14				(0)	100	100		100	100	0	80
4	1.12	2	.56				(0)	100	100		100	100	0	80
4	1.12	2	.56				(0)	100	98		95	98	18	15
4	1.12	2	2.24				(0)	100	98		(3)	98	8	15
4	1.12	2	2.24				(0)	100	100		(0)	100	0	80
4	2.24	2	.14				(0)	100	100		(0)	100	0	48
4	2.24	2	.14				(0)	100	10		(0)	98	0	87
4	2.24	2	.56				(0)	100	100		95	100	0	48
4	2.24	2	.56				(0)	100	100		(5)	98	0	87
4	2.24	2	2.24				(0)	100	100		(0)	100	0	48
4	2.24	2	2.24				(0)	100	100		(2)	100	0	48

TABLE 4-continued

% PLANT INHIBITION AND % SAFENING EFFECT ()													
HERB. NO.	RATE	ANTIDOTE		Foxtail Crabgrass Barnyard									
		NO.	RATE	Sorghum		Green		Large		Grass		Corn	
				W	WO	W	WO	W	WO	W	WO	W	WO
4	2.24	2	2.24			100	100			100	98	18	87
						(0)				(0)		(79)	
4	4.48	2	.14			100	100			100	100	0	92
						(0)				(0)		(100)	
4	4.48	2	.14			100	100			100	100	13	100
						(0)				(0)		(87)	
4	4.48	2	.56			100	100			98	100	0	92
						(0)				(2)		(100)	
4	4.48	2	.56			100	100			100	100	8	100
						(0)				(0)		(92)	
4	4.48	2	2.24			100	100			100	100	0	92
						(0)				(0)		(100)	
4	4.48	2	2.24			10	100			100	100	5	100
						(0)				(0)		(95)	
4	1.12	3	.14			100	100			100	100	8	80
						(0)				(0)		(90)	
4	1.12	3	.56			98	100			100	100	5	80
						(2)				(0)		(93)	
4	1.12	3	2.24			98	100			100	100	0	80
						(2)				(0)		(100)	
4	2.24	3	.14			100	100			100	98	20	87
						(0)				(0)		(77)	
4	2.24	3	.56			100	100			10	98	5	87
						(0)				(0)		(94)	
4	2.24	3	2.24			100	100			100	98	0	87
						(0)				(0)		(100)	
4	4.48	3	.14			100	100			100	100	5	100
						(0)				(0)		(95)	
4	4.48	3	.56			100	100			100	100	0	100
						(0)				(0)		(100)	
4	4.48	3	2.24			100	100			100	100	5	100
						(0)				(0)		(95)	
4	1.12	4	.14			100	100			100	100	0	90
						(0)				(0)		(100)	
4	1.12	4	.14			100	100			100	100	0	80
						(0)				(0)		(100)	
4	1.12	4	.56			100	100			100	100	0	90
						(0)				(0)		(100)	
4	1.12	4	.56			100	100			100	100	10	80
						(0)				(0)		(87)	
4	1.12	4	2.24			100	100			100	100	0	80
						(0)				(0)		(100)	
4	1.12	4	2.24			100	100			100	100	0	90
						(0)				(0)		(100)	
4	2.24	4	.14			100	100			100	100	5	85
						(0)				(0)		(94)	
4	2.24	4	.14			100	100			100	98	0	87
						(0)				(0)		(100)	
4	2.24	4	.56			100	100			100	98	5	87
						(0)				(0)		(94)	
4	2.24	4	.56			100	100			100	100	0	85
						(0)				(0)		(100)	
4	2.24	4	2.24			100	100			100	100	8	85
						(0)				(0)		(90)	
4	2.24	4	2.24			100	100			100	98	5	87
						(0)				(0)		(94)	
4	4.48	4	.14			100	100			100	100	0	100
						(0)				(0)		(100)	
4	4.48	4	.14			100	100			100	100	13	98
						(0)				(0)		(86)	
4	4.48	4	.56			100	100			100	100	5	100
						(0)				(0)		(95)	
4	4.48	4	.56			100	100			100	100	13	98
						(0)				(0)		(86)	
4	4.48	4	2.24			100	100			100	100	10	100
						(0)				(0)		(90)	
4	4.48	4	2.24			100	100			10	100	25	98
						(0)				(0)		(74)	
4	1.12	5	.14			100	100			100	100	5	80
						(0)				(0)		(93)	
4	1.12	5	.56			100	100			100	100	8	80
						(0)				(0)		(90)	
4	1.12	5	2.24			100	100			100	100	0	80
						(0)				(0)		(100)	
4	2.24	5	.56			100	100			10	98	0	87
						(0)				(0)		(100)	
4	2.24	5	2.24			100	100			100	98	0	87

TABLE 4-continued

% PLANT INHIBITION AND % SAFENING EFFECT ()															
HERB. NO.	RATE	ANTIDOTE		Foxtail Crabgrass Barnyard											
		NO.	RATE	Sorghum		Green		Large		Grass		Corn			
				W	WO	W	WO	W	WO	W	WO	W	WO		
4	4.48	5	.14				(0)	100	100			(0)	100	68	100
4	4.48	5	.56				(0)	100	100			(0)	100	8	100
4	4.48	5	2.24				(0)	100	100			(0)	100	5	100
4	1.12	13	.14				(0)	100	100			(0)	100	15	80
4	1.12	13	.56				(0)	100	100			(0)	100	0	80
4	1.12	13	2.24				(0)	100	100			(0)	100	0	80
4	2.24	13	.14				(0)	100	100			(0)	98	53	87
4	2.24	13	.56				(0)	10	100			(0)	98	35	87
4	2.24	13	2.24				(0)	100	100			(0)	98	8	87
4	4.48	13	.14				(0)	100	100			(0)	100	95	100
4	4.48	13	.56				(0)	100	100			(0)	100	75	100
4	4.48	13	2.24				(0)	100	100			(0)	100	28	100
4	1.12	6	.14				(0)	95	100			(0)	100	0	80
4	1.12	6	.56				(5)	98	100			(0)	100	5	80
4	1.12	6	2.24				(2)	100	100			(2)	100	0	80
4	2.24	6	.14				(0)	100	100			(0)	98	0	87
4	2.24	6	.56				(0)	100	100			(0)	98	0	87
4	2.24	6	2.24				(0)	10	100			(0)	98	0	87
4	4.48	6	.14				(0)	100	100			(0)	100	23	100
4	4.48	6	.56				(0)	100	100			(0)	100	5	100
4	4.48	6	2.24				(0)	100	100			(0)	100	0	100

EXAMPLE 42

The following procedure was used to determine the interaction between a herbicide and antidote when the herbicide is topically applied to the soil surface and the antidote is applied to crop seed. Crop plant seed was treated with the antidote either by contacting the seed with antidote in powder form or by contacting the seed with a solution or suspension of antidote compound dissolved or suspended in a suitable solvent, typically methylene chloride or toluene. Relative amounts of antidote compound and seed were used to provide an antidote-on-seed concentration, on a percent weight/weight basis. Containers were filled and compacted with fumigated silt loam type soil to a depth of about 1.3 cm from the top of the container. A first container was designated as an untreated control, a second container was designated as an untreated control, a and a third container was designated as a herbicide+antidote test container. Untreated crop seed was placed in the first and second containers. Antidote-treated crop seed was placed in the third container. Then, each of the second and third containers was filled and leveled with a cover layer of soil having incorporated therein the selected herbicide at a pre-determined concentration. The first container was filled and leveled with soil containing no herbicide. All containers were given about 0.6 cm of

overhead water to simulate an activating rainfall. The containers were placed on a greenhouse bench and sub-irrigated as required for the duration of the test. Plant response was observed about three weeks after initial treatment. Results are set forth in Table 5. Herbicide rate is given in kg/ha and antidote rate is given in percent weight/weight of antidote/seed.

TABLE 5

% PLANT INHIBITION AND % SAFENING EFFECT ()							
HERB. NO.	RATE	ANTI-DOTE		Sorghum Grain		Foxtail Green	
		NO.	RATE	W	WO	W	WO
2	.56	3	.03	0	22	98	100
2	.56	3	.06	0	22	98	100
2	.56	3	.13	15	22	95	100
2	1.12	3	.03	5	50	98	100
2	1.12	3	.06	0	50	100	100
2	1.12	3	.13	5	50	100	100
2	2.24	3	.03	5	65	98	100
2	2.24	3	.06	15	65	100	100

TABLE 5-continued

% PLANT INHIBITION AND % SAFENING EFFECT ()								
HERB. NO.	RATE	ANTI- DOTE NO.	RATE	Sorghum Grain		Foxtail Green		
				W	WO	W	WO	
					(76)		(0)	
2	2.24	3	.13	5	65	100	100	5
					(92)		(0)	
2	.56	20	.03	0	22	98	100	10
					(100)		(2)	
2	.56	20	.06	5	22	100	100	
					(77)		(0)	
2	.56	20	.13	0	22	100	100	
					(100)		(0)	
2	1.12	20	.03	8	50	100	100	15
					(84)		(0)	
2	1.12	20	.06	0	50	100	100	
					(100)		(0)	
2	1.12	20	.13	5	50	100	100	
					(90)		(0)	
2	2.24	20	.03	0	65	100	100	20
					(100)		(0)	
2	2.24	20	.06	10	65	100	100	
					(84)		(0)	
2	2.24	20	.13	10	65	100	100	25
					(84)		(0)	

Following the same procedures described above in Examples 40 to 42, additional tests were conducted in order to exemplify the safening, antidotal properties of the compounds of Examples 33-38 with a plurality of herbicides from diverse classes of chemicals including some of those in the above list of Herbicide Nos. 1-14 previously tested with the safener compounds of Examples 1-32 (see Tables 2-5). Additional herbicides include the following compounds:

Herb No.	Name	
15	2-Methoxy-3,6-dichlorobenzoic acid, dimethylamine salt.	40
16	As-triazine-5(4H)one,4-amino-, 6-tert-butyl-,3-(methylthio)-;	
17	4-Chloro-5-(methylamino)-2-(alpha, alpha, alpha-trifluorom-tolyl)-3(2H)-pyridazonone;	
18	Benzeneamine, N-(1-ethylpropyl)-3, 4-dimethyl-2,6-dinitro-	
19	Benzenesulfonamide, 2-chloro-N-[[[(4-methoxy-6-methyl-1,3,5-triazin-2-yl)amino]carbonyl]-;	

-continued

Herb No.	Name
20	Benzoic acid, 2-[[[(4,6-dimethyl-2-pyrimidinyl)amino]carbonyl]amino]sulfonyl]-, methyl ester;
21	Benzoic acid, 2-[[[(4,6-dimethoxy-2-pyrimidinyl)amino]carbonyl]amino]sulfonyl]methyl]-, methyl ester;
22	3-Quinolinecarboxylic acid, 2-[4, 5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1H-imidazol-2-yl]-;
23	3-isoxazolidinone, 2-[(2-chlorophenyl)methyl]-4,4-dimethyl-
24	3-Pyridinecarboxylic acid, 2-(difluoromethyl)-5-(4,5-dihydro-2-thiazolyl)-4-(2-methylpropyl)-6-(trifluoromethyl)-, methyl ester;
25	3-Pyridinecarboxylic acid, 2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1H-imidazol-2-yl]-;
26	Benzoic acid, 2-[[[(4-methoxy-6-methyl-1,3,5-triazin-2-yl)amino]carbonyl]amino]sulfonyl]-, methyl ester;
27	3-Pyridinecarboxylic acid, 5-ethyl-2-[4-methyl-4-(1-methylethyl)-5-oxo-1H-imidazol-2-yl]-;
28	Benzoic acid, 2-[[[(4-chloro-6-methoxy-2-pyrimidinyl)amino]carbonyl]amino]sulfonyl]-, ethyl ester;
29	Benzenesulfonamide, 2-(2-chloroethoxy)-N-[[[(4-methoxy-6-methyl-1,3,5-triazin-2-yl)amino]carbonyl]-;
30	2-Thiophenecarboxylic acid, 3-[[[(4,6-dimethoxy-1,3,5-triazin-2-yl)amino]carbonyl]amino]sulfonyl]-, methyl ester;
31	3-Pyridinecarboxylic acid, 2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1H-imidazol-2-yl]-5-methyl-, ammonium salt;
32	Benzoic acid, 2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1H-imidazol-2-yl]-4-(OR 5)-methyl-;
33	2-Imidazolidinone, 3-[5-(1,1-dimethylethyl)-3-isoxazolyl]-4-hydroxy-1-methyl-;

EXAMPLE 43

Following the test procedure described in Example 40, the antidotal properties of compounds listed in Table 1, mostly Antidote Nos. 33-38, were tested in combinations with a wide variety of herbicidal compounds, particularly Herbicide Nos. 15-33. Results are shown in Table 6.

55

60

65

TABLE 6-continued

7	0.14	1	0.56					80	90	80	90
								(12)	100	(12)	100
7	0.56	1	0.56					100	100	100	100
								(0)	(0)	(0)	(0)
7	1.12	1	0.56	85	72	100	100				
						(0)					
7	4.48	1	0.56	100	95	100	100				
						(0)					
7	0.14	1	2.24					45	90	95	90
								(50)	100	100	100
7	0.56	1	2.24					100	100	100	100
								(0)	(0)	(0)	(0)
7	1.12	1	2.24	80	72	100	100				
						(0)					
7	4.48	1	2.24	95	95	100	100				
				(0)		(0)					
7	0.14	1	8.96					80	90	100	90
								(12)	100	100	100
7	0.56	1	8.96					100	100	100	100
								(0)	(0)	(0)	(0)
7	1.12	1	8.96	85	72	100	100				
						(0)					
7	4.48	1	8.96	100	95	100	100				
						(0)					
16	0.56	1	0.56	35				10	40		90
								(75)	95		100
16	2.24	1	0.56	0	20			90			100
				(100)				(6)			(0)
16	0.56	1	2.24	0				45	40		90
								100	95		100
16	2.24	1	2.24	35	20						(0)
								20	40		90
16	0.56	1	8.96	5					(50)		100
								90	95		(0)
16	2.24	1	8.96	20	20				(6)		
				(0)							
17	1.68	1	0.14	90	88	100	100				
						(0)					
17	3.36	1	0.14	80	95	100	100				
				(16)		(0)					
17	1.68	1	0.56	90	88	100	100				
						(0)					
17	3.36	1	0.56	88	95	100	100				
				(8)		(0)					
17	1.68	1	2.24	85	88	100	100				
				(4)		(0)					
17	3.36	1	2.24	83	95	100	100				
				(13)		(0)					
18	0.56	1	0.56					95	78	0	97
										(100)	
18	1.12	1	0.56	55	42	100	100				
						(0)					
18	2.24	1	0.56					95	97	100	100
								(3)	(0)	(0)	(0)

TABLE 6-continued

18	4.48	1	0.56	65	80	100	100													
18	0.56	1	2.24	(19)	(0)			65	78	95	97									
18	1.12	1	2.24	40	42	100	100	(17)	(3)											
18	2.24	1	2.24	(5)	(0)			100	97	100	100									
18	4.48	1	2.24	70	80	100	100			(0)										
18	0.56	1	8.96	(13)	(0)			70	78	100	97									
18	1.12	1	8.96	60	42	100	100	(11)												
18	2.24	1	8.96	(3)	(0)			95	97	100	100									
18	4.48	1	8.96	90	80	100	100			(0)										
19	0.009	1	1.12	(0)								90	90	95	88					
19	0.01	1	1.12	25	90							(0)	90	85						
19	0.03	1	1.12	(73)				10	30			95	95	95						
19	0.03	1	1.12					(67)				(0)	90	90	95					
19	0.07	1	1.12	45	97							(0)	90	90	(0)					
19	0.14	1	1.12	(54)				65	70			95	95	95						
19	0.009	1	4.48					(8)				(0)	90	90	88					
19	0.01	1	4.48	5	90							(0)	90	85						
19	0.03	1	4.48	(95)								(18)	90	90	95					
19	0.03	1	4.48									(0)	100	95	(0)					
19	0.07	1	4.48	80	97			0	30			(100)	95	90						
19	0.14	1	4.48	(18)				10	70				95	95						
20	0.004	1	1.12					15	22			(86)	0	25	0	10				
20	0.004	1	1.12	(32)								(100)	70	30	27					
20	0.004	1	1.12	0	12							(100)	0	10						
20	0.009	1	1.12	45	38							(100)	50	40						
20	0.009	1	1.12					35	73				75	35	25	68				
20	0.009	1	1.12	(53)									80	60	25	(64)				
20	0.004	1	4.48	0	12								60	10	25	42				
20	0.004	1	4.48										60	10	(41)					

TABLE 6-continued

20	0.004	1	4.48	(100)	10	22	85	25	10	10	35	47	45	35
20	0.004	1	4.48		10	(55)	70	30	20	(0)	75	(26)	68	30
20	0.009	1	4.48		65	73	90	35	20	(26)	45	67	45	30
20	0.009	1	4.48		(11)		75	60 *	60	(12)	0	47	30	35
20	0.009	1	4.48	0	38		50	40			(100)	(33)	68	(15)
21	0.28	1	0.14								35	68	45	30
21	0.56	1	0.14								70	67	35	30
21	1.12	1	0.14								0	47	15	35
21	0.28	1	0.56								45	68	35	30
21	0.56	1	0.56								(100)	(34)	67	25
21	1.12	1	2.24								25	67	25	30
21	0.28	1	8.96								10	47	20	35
21	0.56	1	8.96								10	68	50	30
21	1.12	1	8.96								55	67	80	30
22	1.12	1	0.03	33	42				100	98	(18)			
22	2.24	1	0.03	63	60				100	100				
22	0.28	1	0.14			5	20		(0)			10	20	
22	0.28	1	0.14	5	17	(75)			95	90		(50)		
22	0.56	1	0.14	10	12				100	85				
22	1.12	1	0.14	10	38				80	100				
22	1.12	1	0.14	75	98				100	100				
22	1.12	1	0.14	(24)					(0)					
22	1.12	1	0.14	30	42	90	78		100	98		75	95	(22)
22	2.24	1	0.14	43	60				100	100				
22	0.28	1	0.56	(29)		5	20		(0)			10	20	

TABLE 6-continued

24	0.28	1	0.14	25	15	100	100											80	63
24	1.12	1	0.14	95	92	100	(0)											95	95
24	0.28	1	0.56	40	15	100	(0)											55 (0)	63
24	1.12	1	0.56	85	92	100	(0)											95 (13)	95
24	0.28	1	2.24	10	15	100	(8)											75 (0)	63
24	1.12	1	2.24	70	92	100	(34)											95	95
25	0.14	1	0.56				(24)							10	60			35 (0)	38
25	0.14	1	0.56							10	43			50	35			90	92
25	0.56	1	0.56							10	(77)			95	85			95	(3)
25	0.56	1	0.56							95	95			95	80			77	95
25	0.14	1	1.12							80	(0)			15	48			90	(0)
25	0.56	1	1.12							95	95			90	95			95	95
25	0.14	1	2.24							35	(0)			35	60			70	(0)
25	0.14	1	2.24							35	(19)			60	35			90	92
25	0.56	1	2.24							95	95			90	85			90	(3)
25	0.56	1	2.24							95	(0)			95	80			100	95
25	0.14	1	4.48							25	23			0	48			85	52
25	0.56	1	4.48							95	95			95	95			95	95
25	0.14	1	8.96							95	(0)			45	60			45	(0)
25	0.14	1	8.96							0	43			0	35			10	92
25	0.56	1	8.96							65	(100)			70	80			95	(90)
25	0.56	1	8.96								(32)			10	85			95	95
26	0.03	1	1.12											10	85			85	(0)
26	0.07	1	1.12											95	95			95	95
26	0.07	1	1.12											80	60			(0)	
26	0.07	1	1.12											100	83			10	
26	0.14	1	1.12							15	95			95	98			95	95
26	0.28	1	1.12							90	(6)			100	(4)			(0)	
26	0.28	1	1.12											90	97			35	68
26	0.28	1	1.12											95	55			(49)	

TABLE 6-continued

28	0.004	1	4.48		5	43	95	70	0	18
					(89)				(100)	
28	0.01	1	4.48		60	95	80	75	15	75
					(37)				(80)	
28	0.01	1	4.48	0			75	75		
				(100)			(0)			
28	0.07	1	4.48	10			90	88		
				(80)						
28	0.28	1	4.48				95	98	15	5
							(4)			
28	1.12	1	4.48				100	100	55	60
							(0)		(9)	
29	0.01	1	1.12				0	27	95	73
							(100)			
29	0.07	1	1.12				85	70	95	95
									(0)	
29	0.28	1	1.12	10			85	55		
				(85)						
29	0.56	1	1.12				100	100		35
							(0)			10
29	1.12	1	1.12				90	90		
							(0)			
29	1.12	1	1.12	65			100	98		0
				(31)						(100)
29	0.01	1	4.48				50	27	85	73
							25	70	90	95
29	0.07	1	4.48				70	55		(6)
							(65)			
29	0.28	1	4.48	5			70	55		
				(93)						
29	0.56	1	4.48				70	100		0
							(90)			10
29	1.12	1	4.48				100	98		(100)
							(30)			10
29	1.12	1	4.48				100	90		(17)
29	0.01	1	0.14				40	40	15	7
							(0)			
30	0.03	1	0.14				50	50	0	12
							(0)		(100)	
30	0.01	1	0.56				0	40	25	7
									(100)	
30	0.03	1	0.56				0	50	0	12
							(100)		(100)	
30	1.12	1	1.12	30			100	100		
				(68)			(0)			
30	1.12	1	1.12				100	100		5
							(0)			(88)
30	4.48	1	1.12	30			100	100		
				(70)			(0)			
30	4.48	1	1.12				100	100		45
							(0)			(10)
30	0.01	1	2.24				20	40	15	7
							(50)			

TABLE 6-continued

	30	0.03	1	2.24	10	93	30	50	10	12
30	0.03	1	2.24				30	(40)	10	(17)
30	1.12	1	4.48	10	93		100	100		
30	1.12	1	4.48		(90)	55	(0)	100	0	40
30	4.48	1	4.48			(38)	100	100	(100)	
30	4.48	1	4.48			80	100	100	25	50
30	4.48	1	4.48	65	97	(14)	(0)	100	(50)	
31	0.14	1	0.56		(33)		(0)	85	0	28
31	0.14	1	0.56	0			(6)	35	(100)	
31	0.14	1	0.56				40	60		
31	0.56	1	0.56	30	75		60	80	35	32
31	0.56	1	0.56		(60)		(25)	90	100	(0)
31	0.56	1	0.56				90	90	30	50
31	0.14	1	2.24	0			(0)	35	(40)	
31	0.14	1	2.24				95	90	60	95
31	0.14	1	2.24				35	35	(37)	100
31	0.14	1	2.24				0	60	50	32
31	0.14	1	2.24				(100)	85	80	80
31	0.56	1	2.24				(30)	90	70	95
31	0.56	1	2.24				85	90	28	100
31	0.56	1	2.24				(6)	90	45	50
31	0.56	1	2.24	0	75		(0)	80	(10)	
31	0.56	1	2.24		(100)		35	80		
31	0.14	1	8.96				(57)	60		
31	0.14	1	8.96	0			35	60	10	32
31	0.14	1	8.96				(42)	35	(69)	75
31	0.14	1	8.96				55	35	25	100
31	0.56	1	8.96				70	85	60	28
31	0.56	1	8.96				(18)	90		
31	0.56	1	8.96				95	90	55	95
31	0.56	1	8.96				95	90	(43)	100
31	0.56	1	8.96	0	75		70	80	65	50
23	0.03	2	1.12		(100)		(13)	40		
23	0.14	2	1.12				65	50		
23	0.03	2	4.48				0	15		
23	0.14	2	4.48				(100)	50		
25	0.14	2	1.12				35	58		
25	0.56	2	1.12				0	25		
							35	58		
							(40)	25		
							0	15		
							55	50		
							(40)	83		
							25	23		
							95	95		
							(11)	95		
							0	83		
							15	83		
							(82)	52		
							85	95		
							0	95		

TABLE 6-continued

25	0.14	2	4.48				90	23	85	48	90	52
25	0.56	2	4.48				95	95	95	95	95	95
27	0.14	2	1.12	0	12		65	(0)	(0)		(0)	
				(100)								
27	0.56	2	1.12	60	53				70	65		
27	0.14	2	4.48	0	12				70	40		
				(100)								
27	0.56	2	4.48	5	53				75	65		
				(91)								
6	8.96	3	0.14	5	13	95						
				(62)		(0)						
6	11.20	3	0.14	5	30	95						
				(84)		(0)						
6	8.96	3	0.56	10	13	95						
				(24)		(0)						
6	11.20	3	0.56	0	30	95						
				(100)		(0)						
6	8.96	3	2.24	0	13	95						
				(100)		(0)						
6	11.20	3	2.24	0	30	95						
				(100)		(0)						
2	0.56	3	0.03				75	98	98	100		
							(24)	98	95	(2)	100	
2	0.56	3	0.03				75	(24)	98	(5)	100	
							95	(4)	98	(0)	100	
2	2.24	3	0.03				93	(6)	98	(0)	100	
							0	(100)	85	(0)	100	
2	0.28	3	0.14				10	(90)	93	(10)	100	
							85	(14)	98	(0)	100	
2	0.56	3	0.14				43	(57)	98	(0)	100	
							5	(94)	75	(0)	98	
2	2.24	3	0.14				55	(44)	98	(0)	100	
							95	(4)	98	(0)	100	
2	2.24	3	0.14				95	(4)	98	(0)	100	
							25	(75)	97	(0)	100	
2	0.28	3	0.56				0	(100)	85	(5)	100	
							20	(79)	93	(5)	100	
2	0.56	3	0.56				78		98	(5)	100	

TABLE 6-continued

15	1.12	3	8.96	0	10	(100)	(39)	25	50
15	4.48	3	8.96	0	(100)	(100)	(50)	30	50
15	4.48	3	8.96	0	(100)	(100)	(40)	95	100
7	0.14	3	0.56	70	72	100	(74)	90	90
7	0.56	3	0.56	95	95	100	(0)	100	100
7	1.12	3	0.56	70	72	100	(0)	(0)	(0)
7	4.48	3	0.56	95	95	100	(0)	(0)	(0)
7	0.14	3	2.24					70	90
7	0.56	3	2.24				(23)	90	95
7	1.12	3	2.24	90	72	100	(0)	100	100
7	4.48	3	2.24	100	95	100	(0)	100	100
7	0.14	3	8.96					75	90
7	0.56	3	8.96				(17)	90	100
7	1.12	3	8.96	90	72	100	(0)	100	100
7	4.48	3	8.96	100	95	100	(0)	100	100
16	0.56	3	0.56	10				20	40
16	2.24	3	0.56	35	20		(50)	95	95
16	0.56	3	2.24	0			(0)	35	40
16	2.24	3	2.24	30	20		(13)	85	95
16	0.56	3	8.96	5			(11)	0	40
16	2.24	3	8.96	50	20		(100)	90	95
17	1.68	3	0.14	88	88	100	(6)	100	(0)
17	3.36	3	0.14	93	95	100	(0)	100	100
17	1.68	3	0.56	60	88	98	(3)	100	100
17	3.36	3	0.56	90	95	100	(32)	95	100
17	1.68	3	2.24	88	88	100	(6)	100	100
17	3.36	3	2.24	95	95	100	(0)	100	100

TABLE 6-continued

18	0.56	3	0.56	(0)	(0)	100	78	95	97	
18	1.12	3	0.56	60	42	100	(3)			
18	2.24	3	0.56	(0)		100	97	100	100	
18	4.48	3	0.56	70	80	100	(0)			
18	0.56	3	2.24	(13)	(0)	30	78	100	97	
18	1.12	3	2.24	45	42	100	(62)			
18	2.24	3	2.24	(0)		95	97	100	100	
18	4.48	3	2.24	65	80	100	(3)	(0)		
18	0.56	3	8.96	(19)	(0)	95	78	100	97	
18	1.12	3	8.96	60	42	100				
18	2.24	3	8.96	(0)		90	97	100	100	
18	4.48	3	8.96	70	80	100	(8)	(0)		
19	0.009	3	1.12	(13)	(0)					85 90
19	0.01	3	1.12	5	90					(6) 85
19	0.03	3	1.12	(95)						95 95
19	0.03	3	1.12			0	30			(0)
19	0.07	3	1.12	35	97	(100)				95 95
19	0.14	3	1.12	(64)		65	70			(6) 95
19	0.009	3	4.48			(8)				(0) 95
19	0.01	3	4.48	10	90					80 88
19	0.03	3	4.48	(89)						(10)
19	0.03	3	4.48			0	30			
19	0.07	3	4.48	15	97	(100)				95 95
19	0.14	3	4.48	(85)		10	70			(0)
20	0.004	3	1.12	10	12					100 95
20	0.004	3	1.12	(17)		0	22			90 90
20	0.004	3	1.12			(100)				(0) 95
20	0.004	3	1.12							90 90
20	0.004	3	1.12			60				(0) 95
20	0.004	3	1.12			65				60 10
20	0.004	3	1.12			60				25 27
20	0.004	3	1.12			0				0 10
20	0.004	3	1.12			(100)				(100)

TABLE 6-continued

22	1.12	3	0.14	35	42	100	98		
22	2.24	3	0.14	58	60	100	100		
22	0.28	3	0.56	15	17	90	90		
22	0.28	3	0.56		(12)	(0)	(0)	25	20
22	0.56	3	0.56	5	12	90	85		
22	1.12	3	0.56		(59)			35	95
22	1.12	3	0.56	10	38	100	100		(64)
22	1.12	3	0.56	85	98	100	(0)		
22	1.12	3	0.56	5	42	100	(0)		
22	2.24	3	0.56	38	60	100	100		
22	0.28	3	2.24	0	17	90	(0)		
22	0.28	3	2.24		(100)	(0)	(0)	15	20
22	0.56	3	2.24	0	12	100	85		(25)
22	1.12	3	2.24	10	38	100	100		
22	1.12	3	2.24		(74)	(0)	(0)	80	95
22	1.12	3	2.24	40	98	100	100		(16)
23	0.03	3	0.56	10	25				
23	0.03	3	0.56		(60)				5
23	0.03	3	0.56		(60)				(80)
23	0.14	3	0.56	25	35	95	65	15	45
23	0.14	3	0.56	25	95	100	90	85	97
23	0.14	3	0.56		(74)				(13)
23	0.14	3	0.56	58	99	60	55		
23	0.14	3	0.56		(42)				
23	0.56	3	0.56	70	80	70	70		
23	0.03	3	1.12	90	100		(0)		
23	0.03	3	1.12		(10)				
23	0.03	3	1.12	5					
23	0.14	3	1.12		5			35	25
23	0.14	3	1.12		68			40	83
23	0.03	3	2.24		(93)				(52)
23	0.03	3	2.24	10	35			0	45
23	0.03	3	2.24		(72)				(100)
23	0.03	3	2.24	5	25				

TABLE 6-continued

23	0.14	3	2.24	70	80	(80)	90	95	100	90	97	30	50	(80)
23	0.14	3	2.24	23	99	(13)	5	55	60	15	25	(40)		
23	0.14	3	2.24			(77)	0	58	40	50	(100)			
23	0.56	3	2.24	85	100	(15)	0	(100)	15	75	85	83		
23	0.03	3	4.48	0							0			
23	0.03	3	4.48								(100)			
23	0.14	3	4.48								85	83		
23	0.14	3	4.48	0	68									
23	0.03	3	8.96	15	25	(100)								
23	0.03	3	8.96			(40)								
23	0.03	3	8.96											
23	0.14	3	8.96				15	35	80	65	0	45		
23	0.14	3	8.96	55	80		15	(58)	100	90	(100)			
23	0.14	3	8.96				55	(43)			85	97		
23	0.14	3	8.96											
23	0.14	3	8.96	12	99	(32)								
23	0.14	3	8.96			(88)								
23	0.56	3	8.96	95	100	(5)								
24	0.28	3	0.14	15	15	100								
24	1.12	3	0.14	70	92	(0)								
24	0.28	3	0.56	15	15	100								
24	1.12	3	0.56	95	92	(0)								
24	0.28	3	2.24	10	15	100								
24	1.12	3	2.24	95	92	(34)								
25	0.14	3	0.56											
25	0.14	3	0.56											
25	0.28	3	0.56	95	82									
25	0.28	3	0.56	70	92	(24)								
25	0.56	3	0.56											
25	0.56	3	0.56											
25	1.12	3	0.56	100	100	(0)								
25	1.12	3	0.56	100	100									

TABLE 6-continued

25	0.14	3	1.12	(0)	70	23	20	48	90	52
25	0.56	3	1.12		100	95	80	(59)	95	95
25	0.14	3	2.24		0	43	10	35	(0)	92
25	0.14	3	2.24		(100)		100	(72)	25	(73)
25	0.28	3	2.24	90	82		95	98		
25	0.28	3	2.24	90	92		85	(4)	40	38
25	0.56	3	2.24	(3)			80	85	85	77
25	0.56	3	2.24		95	95	90	(6)	95	95
25	1.12	3	2.24	100	100	(0)	95	100	(0)	
25	1.12	3	2.24	(0)	100		80	(5)	70	
25	0.14	3	4.48		80	23	75	48	95	52
25	0.56	3	4.48		95	95	85	95	95	95
25	0.14	3	8.96		30	43	75	(11)	(0)	92
25	0.14	3	8.96		(31)		90	60	30	(46)
25	0.28	3	8.96	95	92		85	60		
25	0.28	3	8.96	95	82		95	98		
25	0.56	3	8.96		85	95	90	(4)	95	95
25	0.56	3	8.96		(11)		90	80	(0)	
25	1.12	3	8.96	100	100		90	85	80	77
25	1.12	3	8.96	(0)	100		100	100		
32	2.24	3	0.56	20	10		80	70		
32	4.48	3	0.56	15	40		15	55		
32	2.24	3	2.24	(63)	40		60	(73)	55	
32	4.48	3	2.24	10	40		75	55	55	
32	2.24	3	8.96	(75)	20	10	80	55	80	55
32	4.48	3	8.96	(63)	15	40	80	55	80	55
26	0.03	3	1.12		90	95	95	95	95	95
26	0.07	3	1.12		15	95	(6)	(0)	15	
26	0.07	3	1.12	10	95		70	83		
				(90)			(16)	60		

TABLE 6-continued

27	0.14	3	4.48	0	12	(11)	60	40	(34)					
				(100)			75	65						
27	0.56	3	4.48	20	53		100	95			90	98		
				(63)							(9)			
27	0.14	3	8.96	0	8			75	70					
				(100)			100	100						
27	0.56	3	8.96	28	97			85	85					
				(72)			100	100	(0)					
27	0.56	3	8.96	30	90		70	80						
				(67)			95	80	(13)					
27	1.12	3	8.96	90	97									
				(8)			75	70						
27	1.12	3	8.96	0	10		65	73						
				(100)			70	70	(11)					
27	2.24	3	8.96				40	43						
							(7)							
28	0.004	3	1.12	0			65	95						
							(32)							
28	0.01	3	1.12	0	10			75						
				(100)			85	75	(20)					
28	0.01	3	1.12	5	48		85	88						
				(90)			95	98	(4)					
28	0.28	3	1.12											
							100	100	(4)					
28	1.12	3	1.12				10	43						
							(77)							
28	0.004	3	4.48				85	75						
							(11)							
28	0.01	3	4.48	0	10			75						
				(100)			70	75	(7)					
28	0.07	3	4.48	0	48		95	98						
				(100)			95	100	(4)					
28	0.28	3	4.48											
							0	5						
28	1.12	3	4.48	0	63									
				(100)			0	75	(0)					
28	0.01	3	1.12				0	27						
							(100)	95						
29	0.07	3	1.12				75	70						
							90	55						
29	0.28	3	1.12	0	63									
				(100)			100	100						
29	0.56	3	1.12				70	95						
							(27)							
29	1.12	3	1.12				80	95						
							(16)							

TABLE 6-continued

29	1.12	3	1.12	30	93	80	90		
29	0.01	3	4.48	(68)		(12)	27	75	73
29	0.07	3	4.48			0	70	95	95
29	0.28	3	4.48	5	63	(100)	(0)		
29	0.56	3	4.48	(93)		80	55		
29	1.12	3	4.48			100	100	0	10
29	1.12	3	4.48			(0)		(100)	
29	1.12	3	4.48			100	98	0	12
29	1.12	3	4.48	15	93	100	90	(100)	
30	0.01	3	0.14	(84)		0	40	20	7
30	0.03	3	0.14			(100)			
30	0.01	3	0.56			50	50	0	12
30	0.03	3	0.56			(0)		(100)	
30	1.12	3	1.12			60	40	20	7
30	1.12	3	1.12			35	50	20	12
30	1.12	3	1.12			(30)			
30	1.12	3	1.12	30	93	100	100	5	40
30	4.48	3	1.12	(68)		(0)		(88)	
30	4.48	3	1.12			100	100	55	50
30	4.48	3	1.12	50	97	100	100		
30	0.01	3	2.24	(49)		(0)			
30	0.03	3	2.24			0	40	0	7
30	1.12	3	4.48	5	93	(100)	(100)		
30	1.12	3	4.48	(95)		70	50	25	12
30	4.48	3	4.48	45	97	100	100	0	40
30	4.48	3	4.48	(54)		(0)		(100)	
30	0.14	3	0.56			100	100	75	50
31	0.14	3	0.56			(0)		10	32
31	0.14	3	0.56			60	60	(69)	95
31	0.14	3	0.56	0	75	(0)		(5)	100
31	0.56	3	0.56	10	75	90	85	45	28
31	0.56	3	0.56	(87)		75	35		
31	0.56	3	0.56			70	80		
31	0.56	3	0.56			(13)			
31	0.56	3	0.56			90	90	80	50
31	0.56	3	0.56			(0)			
31	0.14	3	2.24			95	90	95	100
31	0.14	3	2.24			95	85	(0)	100
31	0.14	3	2.24			95	5	28	(0)
31	0.14	3	2.24			60	60	(83)	
31	0.14	3	2.24			60	40	32	100
31	0.14	3	2.24			(0)			(0)

TABLE 6-continued

27	0.14	13	4.48	0	12	70	40		
27	0.56	13	4.48	5	(100) 53	75	65		
19	0.009	27	1.12			90	90	75	88
19	0.01	27	1.12	0	90	(0)	85	(15)	
19	0.03	27	1.12		(100)	70	90		
19	0.03	27	1.12			95	95	95	95
19	0.07	27	1.12	5	97	(0)	90	(0)	
19	0.14	27	1.12		(95)	85	95		
19	0.009	27	4.48			85	90	95	88
19	0.01	27	4.48	10	90	(0)	85		
19	0.03	27	4.48		(89)	95	90		
19	0.03	27	4.48			95	95	95	95
19	0.07	27	4.48	25	97	(0)	90	(0)	
19	0.14	27	4.48		(75)	90	95		
20	0.004	27	1.12			5	70	(93)	
20	0.004	27	1.12			0	22	(100)	0
20	0.004	27	1.12	0	12	40	10	(40)	10
20	0.004	27	1.12		(100)	65	30	35	27
20	0.009	27	1.12			60	35	30	68
20	0.009	27	1.12			95	73	(59)	50
20	0.009	27	1.12	0	38	25	60	42	
20	0.004	27	4.48		(100)	55	40		
20	0.004	27	4.48			40	30	45	27
20	0.004	27	4.48	0	12	25	10		
20	0.004	27	4.48		(100)	0	25	10	10
20	0.009	27	4.48	0	38	(100)	40	(0)	
20	0.009	27	4.48			55	35	15	68
20	0.009	27	4.48		(100)	95	73	(78)	
20	0.009	27	4.48			55	60	35	42
26	0.03	27	1.12			80	95	95	95
26	0.07	27	1.12	15	95	100	60	(16)	(0)
					(85)				

26	0.07	27	1.12	90	95	95	83	15
26	0.14	27	1.12	(6)	95	98	95	95
26	0.28	27	1.12	95	95	(4)	(0)	0
26	0.28	27	1.12	(0)	100	97		68
26	0.28	27	1.12					(100)
26	0.03	27	4.48		95	95	95	95
26	0.07	27	4.48	50	95	(0)	(0)	15
26	0.07	27	4.48	(48)	100	83		
26	0.14	27	4.48		100	60		
26	0.28	27	4.48	95	95	98	95	95
26	0.28	27	4.48	(0)	90	(4)	(0)	15
26	0.28	27	4.48		65	97		68
28	0.004	27	1.12	40	43			(78)
28	0.01	27	1.12	(7)	75	70		10
28	0.01	27	1.12	80	95	75		18
28	0.07	27	1.12	(16)		(0)		(45)
28	0.28	27	1.12		50	75		0
28	0.07	27	1.12		95	(34)		75
28	0.28	27	1.12		95	88		(100)
28	1.12	27	1.12		95	98		
28	0.004	27	4.48	15	43	(4)		0
28	0.01	27	4.48	(66)	60	100	35	(100)
28	0.01	27	4.48	(37)		(0)	(42)	60
28	0.07	27	4.48		80	70		0
28	0.28	27	4.48		85	75		18
28	0.01	27	4.48		65	75		100
28	0.07	27	4.48		90	(14)		0
28	0.28	27	4.48		95	88		75
28	1.12	27	4.48		95	100		(100)
29	0.01	27	1.12		70	27		5
29	0.07	27	1.12		0	70		(100)
29	0.28	27	1.12		85	(100)		60
29	0.56	27	1.12	90	95	100		5
29	1.12	27	1.12	(6)	95	100		63
29	0.07	27	1.12		100	98		(93)
29	0.28	27	1.12		95	55		
29	0.56	27	1.12		95	100		0
29	1.12	27	1.12		95	(5)		10
29	0.07	27	1.12		100	98		(100)
29	0.28	27	1.12		95	95		12
29	0.56	27	1.12		95	95		(17)
29	1.12	27	1.12		95	98		

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20	0.004	7	1.12	(100)	0	22	(6)	20	25	0	10
20	0.004	7	1.12	(100)	(100)		(20)	60	30	(100)	
20	0.004	7	1.12					10	10	20	27
20	0.009	7	1.12				(0)	10	40	(26)	
20	0.009	7	1.12				(75)	0	60	70	42
20	0.009	7	1.12				(100)	75	35	80	68
20	0.004	7	4.48			85	73	15	25	10	10
20	0.004	7	4.48			5	22	(40)		(0)	
20	0.004	7	4.48			(78)		10	10		
20	0.004	7	4.48					0	30	35	27
20	0.009	7	4.48					60	60	40	42
20	0.009	7	4.48					30	40	(5)	
20	0.009	7	4.48					10	35	85	68
23	0.03	7	1.12			90	73	55	75		
23	0.14	7	1.12					55	75		
23	0.03	7	4.48					0			
23	0.14	7	4.48					75	75		
26	0.03	7	1.12					(0)			
26	0.07	7	1.12			85	95	80	95	95	95
26	0.07	7	1.12			(11)		(16)	83	(0)	35
26	0.14	7	1.12					60	60		
26	0.28	7	1.12					85	98	95	95
26	0.28	7	1.12					(14)	97	(0)	30
26	0.28	7	1.12			95	95	100	97	30	68
26	0.03	7	4.48			(0)		70	55	(56)	
26	0.07	7	4.48					85	95	95	95
26	0.07	7	4.48					(11)	60	(0)	
26	0.07	7	4.48					100	60		
26	0.07	7	4.48			10	95	85	83		0
26	0.14	7	4.48			(90)		95	98	100	95
26	0.28	7	4.48					(4)	55		
26	0.28	7	4.48					100	55		
26	0.28	7	4.48			85	95	100	97	15	68

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28	0.004	7	1.12		20	(11)	43	70	70	(78)	0	18
					(54)			(0)		(100)		
28	0.01	7	1.12	0			10	70	75			
				(100)				(7)				
28	0.01	7	1.12		70		95	95	75		40	75
					(27)						(47)	
28	0.07	7	1.12	5			48	90	88			
				(90)								
28	0.28	7	1.12					100	98		60	5
								95	100		25	60
28	1.12	7	1.12					(5)		(59)		
28	0.004	7	4.48		15		43	90	70		0	18
					(66)						(100)	
28	0.01	7	4.48		40		95	80	75		5	75
					(58)						(94)	
28	0.01	7	4.48	5			10	80	75			
				(50)								
28	0.07	7	4.48	5			48	90	88			
				(90)								
28	0.28	7	4.48					100	98		55	5
								100	100		65	60
28	1.12	7	4.48					(0)				
29	0.01	7	1.12					0	27	100	73	
								(100)				
29	0.07	7	1.12					95	70	95	95	
29	0.28	7	1.12	0			63	90	55	(0)		
				(100)								
29	0.56	7	1.12		90		95	100	100		0	10
					(6)			(0)			(100)	
29	1.12	7	1.12		95		95	100	98		0	12
					(0)						(100)	
29	1.12	7	1.12	25			93	80	90			
				(74)				(12)				
29	0.01	7	4.48					0	27	90	73	
								(100)				
29	0.07	7	4.48					25	70	95	95	
								(65)		(0)		
29	0.28	7	4.48	0			63	90	55			
				(100)								
29	0.56	7	4.48		80		95	95	100		10	10
					(16)			(5)			(0)	
29	1.12	7	4.48		80		95	95	98		15	12
					(16)			(4)				
29	1.12	7	4.48	5			93	100	90			
				(95)								
30	1.12	7	1.12		80		88	100	100		0	40
					(10)			(0)			(100)	
30	1.12	7	1.12	60			93	100	100			
				(36)				(0)				
30	4.48	7	1.12	95			97	100	100			
				(3)				(0)				

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30	4.48	7	1.12	95	93	100	100	95	50
30	1.12	7	4.48	85	88	100	(0)	0	40
30	1.12	7	4.48	(4)		100	(0)	(100)	
30	4.48	7	4.48	95	93	100	(0)	90	50
30	4.48	7	4.48			100	(0)		
19	0.009	28	1.12			90	(0)	95	88
19	0.01	28	1.12			85	(0)		
19	0.03	28	1.12	10	30	90	(0)		
19	0.03	28	1.12	(67)		90	(6)	95	95
19	0.07	28	1.12			85	(0)	(0)	
19	0.14	28	1.12	50	70	90	(6)		
19	0.009	28	4.48	(29)		90	(6)		88
19	0.01	28	4.48			90	(0)		
19	0.03	28	4.48	0	30	95	95		
19	0.03	28	4.48	(100)		95	(0)	95	95
19	0.07	28	4.48			90	90	(0)	
19	0.14	28	4.48	30	70	95	(0)		
20	0.004	28	1.12	(58)		60	(0)	10	27
20	0.004	28	1.12			0	10	(63)	
20	0.004	28	1.12	0	22	0	(100)		10
20	0.009	28	1.12	(100)		20	(100)	25	25
20	0.009	28	1.12			90	(50)	45	42
20	0.009	28	1.12	80	73	25	35	20	68
20	0.004	28	4.48			0	(29)	(71)	
20	0.004	28	4.48	55	22	0	(100)	40	27
20	0.004	28	4.48			0	25	5	10
20	0.009	28	4.48			20	(100)	(50)	
20	0.009	28	4.48			45	40		

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20	0.009	28	4.48					70	60	75	42	60	68
20	0.009	28	4.48					60	35			60	(12)
23	0.03	28	1.12	0				0					
23	0.14	28	1.12	10	68			50	75				
23	0.03	28	4.48	0	(86)			0	(34)				
23	0.14	28	4.48	40	68			65	75				
26	0.03	28	1.12		(42)			70	95	95	95		
26	0.07	28	1.12	30	95			(27)	(0)				
26	0.07	28	1.12		(69)			50	60				
26	0.14	28	1.12					95	83			35	
26	0.28	28	1.12					100	98	95	95		
26	0.28	28	1.12	95	100			100	97	(0)		30	68
26	0.03	28	4.48		(5)			85	55			(56)	
26	0.07	28	4.48					95	95	95	95		
26	0.07	28	4.48					100	(0)	(0)		10	
26	0.07	28	4.48	10	95			100	60				
26	0.14	28	4.48		(90)			95	98	95	95		
26	0.28	28	4.48					100	(4)	(0)		0	68
26	0.28	28	4.48	85	100			95	55			(100)	
28	0.004	28	1.12		(15)							20	18
28	0.01	28	1.12	5	43			80	70			80	75
28	0.01	28	1.12	90	(89)			95	75				
28	0.01	28	1.12		(6)			85	75				
28	0.07	28	1.12	5	10			90	88				
28	0.28	28	1.12		(50)			95	98	40	5		
28	0.28	28	1.12	5	48			95	(4)				
28	1.12	28	1.12		(90)			95	(5)	60	60		
28	0.004	28	4.48					65	70	(0)		0	18
28	0.01	28	4.48	10	43			100	(8)			(100)	
28	0.01	28	4.48	80	(77)			100	75			10	75
28	0.01	28	4.48		(16)			65	75			(87)	
28	0.07	28	4.48	5	10			95	(14)				
28	0.07	28	4.48	30	48				88				

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28	0.28	28	4.48	95	98	5	5	5
28	1.12	28	4.48	100	(4)	30	(0)	60
29	0.01	28	1.12	(0)	(0)	25	(50)	73
29	0.07	28	1.12			(8)	95	95
29	0.28	28	1.12			(58)	(0)	(0)
29	0.56	28	1.12			65	55	
29	1.12	28	1.12	95	95	100	100	10
29	1.12	28	1.12	(0)	(0)	(0)	98	(0)
29	1.12	28	1.12	(0)	(0)	95	90	(100)
29	0.01	28	4.48			0	27	73
29	0.07	28	4.48			(100)	95	95
29	0.28	28	4.48			85	70	(0)
29	0.56	28	4.48			60	55	
29	1.12	28	4.48	85	(11)	95	100	10
29	1.12	28	4.48			(5)	90	(0)
30	1.12	28	1.12	90	(6)	95	98	10
30	1.12	28	1.12			(4)		(17)
30	4.48	28	1.12	100	100			
30	4.48	28	1.12	(0)	(0)			0
30	4.48	28	1.12	100	(0)			(100)
30	1.12	28	4.48	100	(0)			80
30	1.12	28	4.48	100	(0)			50
30	4.48	28	4.48	100	(0)			
30	4.48	28	4.48	65	88			0
30	4.48	28	4.48	95	(27)			(100)
30	4.48	28	4.48	95	93			65
30	4.48	28	4.48	100	(0)			50
19	0.009	8	1.12	100	(0)			
19	0.01	8	1.12	90	(0)		95	88
19	0.03	8	1.12	(0)	(0)			
19	0.03	8	1.12	85	85			
19	0.03	8	1.12	90	(0)		95	95
19	0.07	8	1.12	0	30		(0)	
19	0.07	8	1.12	(100)	(100)			
19	0.07	8	1.12	90	90			

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19	0.14	8	1.12	(54)	30	70	(0)	90	95		
19	0.009	8	4.48		(58)		(6)	90	90	95	88
19	0.01	8	4.48	5			(0)	85	85		
19	0.03	8	4.48	(95)			(0)	95	90	95	95
19	0.03	8	4.48		30	30	(0)	95	95	(0)	
19	0.07	8	4.48	5			(0)	90	90		
19	0.14	8	4.48	(95)	20	70	(0)	90	95		
20	0.004	8	1.12	0	(72)		(6)	15	10		
20	0.004	8	1.12	(100)				0	30	27	
20	0.004	8	1.12		0	22	(100)	0	25	0	10
20	0.009	8	1.12		70	73	(100)	40	35	90	68
20	0.009	8	1.12		(5)			0	60	60	42
20	0.009	8	1.12	40				50	40	(100)	
20	0.004	8	4.48		0	22	(100)	0	25	0	10
20	0.004	8	4.48	(100)				65	30	(100)	
20	0.004	8	4.48	10				50	10		27
20	0.009	8	4.48	(17)				60	40		
20	0.009	8	4.48	(48)				20	60	80	42
20	0.009	8	4.48		45	73	(67)	15	35	55	68
23	0.03	8	1.12		(39)		(58)	70	15	55	68
23	0.03	8	1.12	5	0			0	50	(20)	
23	0.14	8	1.12		35	58	(40)	55	50	(20)	
23	0.14	8	1.12	15	(40)			30	75	25	83
23	0.03	8	4.48	(78)	10			45	15	(70)	
23	0.03	8	4.48					0	0	0	25
23	0.14	8	4.48	0				45	75	(100)	
23	0.14	8	4.48	15				30	50		83
23	0.14	8	4.48	(78)	20	58		30	40	35	83
25	0.14	8	1.12		35	23	(100)	0	48	35	52

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25	0.56	8	1.12	90	95	90	95	95	95	95	95
25	0.14	8	4.48	35	(6)	30	(6)	80	(0)	80	52
25	0.56	8	4.48	95	95	85	(100)	95	95	95	95
26	0.03	8	1.12	(0)	(11)	80	95	95	(0)	95	(0)
26	0.07	8	1.12	85	95	100	(16)	100	83	15	15
26	0.07	8	1.12	20	95	75	60	75	60		
26	0.14	8	1.12	(79)		100	98	95	95	95	95
26	0.28	8	1.12	90	95	100	97	100	(0)	40	68
26	0.28	8	1.12	80	100	15	55	15	55	40	(42)
26	0.03	8	4.48	(20)		85	(73)	85	95	95	95
26	0.07	8	4.48	10	95	100	(11)	100	60	(0)	(0)
26	0.07	8	4.48	(90)		90	83	90	83	20	20
26	0.14	8	4.48			30	95	95	98	95	95
26	0.28	8	4.48	25	100	(69)		95	(4)	(0)	(0)
26	0.28	8	4.48	(75)		85	95	100	55	0	68
27	0.14	8	1.12	0	12	(11)		100	97	0	(100)
27	0.56	6	1.12	5	53		55	55	40	55	40
27	0.14	8	4.48	0	12		75	75	65	75	65
27	0.56	8	4.48	30	53		55	55	40	55	40
28	0.004	8	1.12	(44)		75	65	75	65	75	65
28	0.01	8	1.12	10	10	30	43	80	70	0	18
28	0.01	8	1.12	(0)	48	(31)	95	85	75	(100)	75
28	0.01	8	1.12	15	48	(43)		95	75	0	(100)
28	0.07	8	1.12	(69)		90	88	90	88		
28	0.28	8	1.12			95	98	95	98	5	5
28	1.12	8	1.12			100	(4)	100	100	(0)	(0)
28	0.004	8	4.48			85	(0)	85	70	70	60
28	0.01	8	4.48	5	10	15	43	60	75	0	18
28	0.01	8	4.48			(66)				(100)	(100)

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28	0.01	8	4.48	(50)	55	95	(20)	75	0	75
					(43)		50			(100)
28	0.07	8	4.48	5	85	88	(34)			
				(90)	100	98	(4)			
28	0.28	8	4.48		100	100		0	5	
					100	100	(0)	55	(100)	60
29	0.01	8	1.12		0	27	0	90	73	
					(100)		(100)	70	95	
29	0.07	8	1.12		0	70	0	95	95	
					(100)		(100)	55	(0)	
29	0.28	8	1.12	0	30	55				
				63	(46)					
29	0.56	8	1.12	(100)	100	100				
					80	95				0
29	1.12	8	1.12		(16)	95				10
					90	95				(100)
29	1.12	8	1.12		(6)					0
										(100)
29	1.12	8	1.12	15		90				
				93						
29	0.01	8	4.48	(84)						
					80	27		95	73	
29	0.07	8	4.48		85	70		95	95	
										(0)
29	0.28	8	4.48	10	80	55				
				63						
29	0.56	8	4.48	(85)						
					60	95		95	100	0
29	1.12	8	4.48		(37)			(5)		(100)
					85	95		100	98	0
29	1.12	8	4.48		(11)					(100)
29	1.12	8	4.48	10		90				
				93						
30	1.12	8	1.12	(90)						
					95	100				
30	1.12	8	1.12	(90)						
					95	100				
30	4.48	8	1.12		85	88				10
					(4)					(75)
30	4.48	8	1.12		90	93				90
					(4)					50
30	4.48	8	1.12	80						
				97						
30	1.12	8	4.48	(18)						
					35	88				10
30	1.12	8	4.48	(100)	(61)					(75)
					80	93				
30	4.48	8	4.48	(59)						70
					80	93				50
30	4.48	8	4.48		(14)					
					0					10
23	0.03	29	1.12							25
					35	15				(60)
23	0.03	29	1.12		25					
					75	75				
23	0.14	29	1.12	(100)						

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23	0.14	29	1.12	0	58	50	50	60	83
23	0.03	29	4.48	(100)	0	(0)	15	(28)	25
23	0.03	29	4.48	10	58	0	75	0	(100)
23	0.14	29	4.48	15	(78)	30	(60)	80	83
23	0.14	29	4.48	10	(83)	50	50	(4)	
25	0.14	29	1.12	10	23	(0)	48	30	52
25	0.56	29	1.12	95	(57)	95	95	(43)	95
25	0.14	29	4.48	45	(0)	(0)	48	(0)	
25	0.56	29	4.48	95	23	60	85	80	52
27	0.14	29	1.12	0	(0)	80	95	85	95
27	0.56	29	1.12	0	12	(16)	40	(0)	
27	0.56	29	1.12	30	(100)	0	40		
27	0.14	29	4.48	0	53	70	65		
27	0.56	29	4.48	0	(44)	50	40		
27	0.56	29	4.48	30	(100)	65	65		
19	0.009	14	1.12	30	(44)	(0)	90	90	88
19	0.01	14	1.12	10	90	80	(12)		
19	0.03	14	1.12	0	(89)	80	85		
19	0.03	14	1.12	0	30	95	90	95	95
19	0.07	14	1.12	10	97	100	95	(0)	
19	0.14	14	1.12	85	70	95	90		
19	0.009	14	4.48	0	(100)	95	90		
19	0.01	14	4.48	5	90	80	85		
19	0.03	14	4.48	0	(95)	95	90	95	95
19	0.03	14	4.48	0	30	(6)	90	(0)	
19	0.07	14	4.48	0	(100)	95	95		
19	0.14	14	4.48	15	70	95	90		
20	0.004	14	1.12	25	(79)	100	95		
20	0.004	14	1.12	0	22	0	25	0	10
20	0.004	14	1.12	0	12	(100)	30	40	27
20	0.004	14	1.12	0	(100)	0	10	(100)	

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28	0.004	14	4.48	10	43	(5)	70	70	(34)	0	18
28	0.01	14	4.48	85	(77)	(0)	80	75		(100)	75
28	0.01	14	4.48		(11)		80	75		(60)	
28	0.07	14	4.48				80	88			
28	0.28	14	4.48			(10)	100	98	5	5	
28	1.12	14	4.48			(5)	95	100	45	(0)	60
29	0.01	14	1.12						0	27	80
29	0.07	14	1.12						(100)	70	95
29	0.28	14	1.12						75	70	95
29	0.56	14	1.12						60	55	(0)
29	1.12	14	1.12	90	95		85	100	85	100	10
29	1.12	14	1.12	85	(6)		95	98	(15)	98	(0)
29	1.12	14	1.12		(11)		95	90	(4)	90	35
29	0.01	14	4.48				60	27		100	73
29	0.01	14	4.48				95	70		95	95
29	0.28	14	4.48				90	55		90	(0)
29	0.56	14	4.48	85	(11)		100	100		100	10
29	1.12	14	4.48				100	90		(0)	(100)
29	1.12	14	4.48	90	95		95	98		95	12
30	1.12	14	1.12	70	(21)		100	100	(4)		
30	1.12	14	1.12				100	100		15	12
30	4.48	14	1.12	95	93		100	100		0	40
30	4.48	14	1.12				95	100		(100)	
30	1.12	14	4.48	55	(38)		95	100		90	50
30	1.12	14	4.48				100	100		0	40
30	1.12	14	4.48				100	100		(100)	
30	4.48	14	4.48	95	93		100	100		60	50
30	4.48	14	4.48				100	100		0	25
23	0.03	30	1.12	0			65	15			

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23	0.14	16	1.12	16	1.12	0	12	45	58	70	50	90	83
23	0.03	16	4.48	16	4.48	(23)		0		0	15	60	25
23	0.14	16	4.48	16	4.48	35	58	35	58	25	50	60	90
25	0.14	16	1.12	16	1.12	70	23	70	23	70	48	50	52
25	0.56	16	1.12	16	1.12	95	95	95	95	95	95	95	95
25	0.14	16	4.48	16	4.48	45	23	45	23	95	48	95	52
25	0.56	16	4.48	16	4.48	90	95	90	95	80	095	95	95
27	0.14	16	1.12	16	1.12	(6)		90	95	(16)	40	(4)	
27	0.56	16	1.12	16	1.12	65	53	50	40	50	40	95	95
27	0.56	16	4.48	16	4.48	75	53	75	65	75	65	95	52
19	0.009	10	1.12	10	1.12			90	90	90	90	95	95
19	0.01	10	1.12	10	1.12	10	90	75	85	(0)	85	95	95
19	0.03	10	1.12	10	1.12	(89)		95	90	(12)	90	95	95
19	0.03	10	1.12	10	1.12			30	30	90	95	(0)	
19	0.07	10	1.12	10	1.12	15	97	(0)		80	90		
19	0.14	10	1.12	10	1.12	(85)		95	70	100	95		
19	0.009	10	4.48	10	4.48			85	90	85	90	95	88
19	0.01	10	4.48	10	4.48	10	90	90	85	(6)	85		
19	0.03	10	4.48	10	4.48	(89)		85	90	85	90	95	95
19	0.03	10	4.48	10	4.48			0	30	(6)	95	(0)	
19	0.07	10	4.48	10	4.48	45	97	0	(100)	90	90		
19	0.14	10	4.48	10	4.48	(54)		10	70	(0)	95		
20	0.004	10	1.12	10	1.12			0	(86)	0	25	0	10
20	0.004	10	1.12	10	1.12	(100)		0	22	(0)	25	0	10
20	0.004	10	1.12	10	1.12			0	(100)	(100)	30	(100)	
20	0.004	10	1.12	10	1.12	25	12	0		0	30		
20	0.009	10	1.12	10	1.12	30	38	55	10	(100)	10		
20	0.009	10	1.12	10	1.12	(22)		50	40	65	27	65	27
20	0.009	10	1.12	10	1.12			90	73	40	35	55	68
20	0.009	10	1.12	10	1.12			30	60	30	60	55	42
						(50)				(50)			

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	20	0.004	10	4.48		0	22		30	60	27
	20	0.004	10	4.48	0	(100)	0	10	25	0	10
	20	0.004	10	4.48	0	(100)		10	(60)		(100)
	20	0.004	10	4.48	5	12		10	10		
	20	0.009	10	4.48	0	(59)		10	40		
	20	0.009	10	4.48	0	(100)		35	60	45	42
	20	0.009	10	4.48	20	73		70	35	10	68
	23	0.03	10	1.12	0	(73)		0		10	(86)
	23	0.03	10	1.12	0			70	15	25	25
	23	0.14	10	1.12	30	58		65	50	55	83
	23	0.14	10	1.12	0	(49)		15	75	55	(34)
	23	0.03	10	4.48	15	68		0	(80)		
	23	0.03	10	4.48	5			40	15	35	25
	23	0.14	10	4.48	45	58		35	50	60	83
	23	0.14	10	4.48	0	(23)		0	(30)		(28)
	25	0.14	10	1.12	25	23		85	48	90	52
	25	0.56	10	1.12	95	95		85	95	95	95
	25	0.14	10	4.48	35	23		75	48	70	52
	25	0.56	10	4.48	80	95		95	95	95	95
	26	0.03	10	1.12	90	(16)		0	(0)		(0)
	26	0.07	10	1.12	90	95		80	95	95	95
	26	0.07	10	1.12	20	95		100	(16)	100	83
	26	0.14	10	1.12	0	(6)		90	60		10
	26	0.28	10	1.12	95	100		95	98	95	95
	26	0.28	10	1.12	95	(5)		95	(4)	95	(0)
	26	0.03	10	4.48	95	95		90	97	30	68
	26	0.07	10	4.48	45	95		50	(8)	95	(56)
	26	0.07	10	4.48	0	(53)		55	(48)	83	0
	26	0.07	10	4.48	25	95		100	(34)	60	
	26	0.14	10	4.48	0	(74)		95	98	95	95
	26	0.28	10	4.48	90	100		100	(4)	55	0

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	29	1.12	10	4.48	20	93	100	90	100	40
	30	1.12	10	1.12	(79)	65	88	10	100	(75)
	30	1.12	10	1.12	30	93	100	(0)	100	
	30	4.48	10	1.12	(68)	0	93	25	100	50
	30	4.48	10	1.12	95	97	(100)	(0)	100	(50)
	30	1.12	10	4.48	(3)	95	88	(0)	100	
	30	1.12	10	4.48	25	93	100	(0)	100	40
	30	4.48	10	4.48	(74)	45	93	(0)	100	(63)
	30	4.48	10	4.48	85	97	(52)	(0)	100	
	23	0.03	11	1.12	(13)	0		(0)	100	50
	23	0.14	11	1.12		25	58	50	15	25
	23	0.03	11	4.48		15	(57)	75	50	(100)
	23	0.14	11	4.48		15	58	25	15	83
	25	0.14	11	1.12		35	(75)	65	50	25
	25	0.56	11	1.12		90	95	90	48	83
	25	0.14	11	4.48		15	23	85	95	(40)
	25	0.56	11	4.48		95	95	(11)	95	52
	27	0.14	11	1.12	0	12	(0)	90	48	095
	27	0.56	11	1.12	(100)	45	53	90	95	(0)
	27	0.14	11	4.48	0	12	(16)	95	95	85 52
	27	0.56	11	4.48	(100)	65	53	(6)	95	95
	19	0.56	11	4.48	65	53	(100)	40	40	(0)
	19	0.009	17	1.12	5	90		65	65	
	19	0.01	17	1.12	(95)			(0)	40	
	19	0.03	17	1.12				60	40	
	19	0.03	17	1.12				75	65	
	19	0.07	17	1.12	90	97		95	90	88
	19	0.14	17	1.12	(8)			90	85	
	19	0.009	17	4.48				95	90	95
	19	0.01	17	4.48				65	30	(0)
	19	0.01	17	4.48				90	95	95
	19	0.01	17	4.48				95	95	95
	19	0.01	17	4.48				95	95	(0)
	19	0.01	17	4.48				90	90	88
	19	0.01	17	4.48				75	70	
	19	0.01	17	4.48				90	90	85

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19	0.03	17	4.48	(0)				90	90	95	95
19	0.03	17	4.48		20	30		(0)	(0)	(0)	
19	0.07	17	4.48	95	97			(0)			
19	0.14	17	4.48	(3)				95	95		
20	0.004	17	1.12		5	22		10	25	10	10
20	0.004	17	1.12		5	(78)		(60)	(0)	(0)	
20	0.004	17	1.12					25	30	35	27
20	0.004	17	1.12					(17)			
20	0.004	17	1.12	15	12			45	10		
20	0.009	17	1.12	20	38			85	40		
20	0.009	17	1.12	(48)				55	60	25	42
20	0.009	17	1.12					(9)		(41)	
20	0.004	17	4.48					85	35		85
20	0.004	17	4.48					0	25		0
20	0.004	17	4.48					(55)			10
20	0.004	17	4.48	0	12			(100)			68
20	0.004	17	4.48	(100)				0	10		0
20	0.004	17	4.48					(100)			10
20	0.009	17	4.48	35	38			0	30	35	27
20	0.009	17	4.48	(8)				(100)			
20	0.009	17	4.48					25	40		
20	0.009	17	4.48					(38)			
20	0.009	17	4.48					45	35		10
20	0.009	17	4.48					0	60	50	42
20	0.009	17	4.48					(100)			(86)
23	0.03	17	1.12	0				55			
23	0.14	17	1.12	45	68			70	75		
23	0.03	17	4.48	(34)				0	(7)		
23	0.14	17	4.48	5	68			0			
26	0.03	17	1.12	(64)				50	75		
26	0.07	17	1.12	75	95			(34)			
26	0.07	17	1.12	(22)				0	60	50	42
26	0.14	17	1.12					40	95	95	95
26	0.28	17	1.12	95	100			(58)	60	(0)	
26	0.28	17	1.12	(5)				15	83		
26	0.03	17	4.48					100	98	95	95
26	0.07	17	4.48					100	83	(0)	
26	0.07	17	4.48					90	55		
26	0.03	17	4.48					100	97		0
26	0.07	17	4.48					95	95	95	68
26	0.07	17	4.48					(0)			(100)
26	0.07	17	4.48					95	95	95	95
26	0.07	17	4.48					0	83	(0)	0
26	0.07	17	4.48					(100)			

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29	1.12	17	4.48		95	95	100	98	15	12
30	1.12	17	1.12		(0)	88	100	100	5	40
30	1.12	17	1.12	90	(15)		(0)		(88)	
30	4.48	17	1.12	(4)	95	93	100	100	85	50
30	4.48	17	1.12	100		97	(0)			
30	1.12	17	4.48		25	88	(5)		0	40
30	1.12	17	4.48	95	(72)		(0)		(100)	
30	4.48	17	4.48		95	93	(0)		20	50
30	4.48	17	4.48	95		97	(0)		(60)	
6	8.96	20	0.14	5		(3)	(0)			
6	11.20	20	0.14	(62)	95	95				
6	8.96	20	0.56	15	(84)	90	(0)			
6	11.20	20	0.56	5		(6)				
6	8.96	20	2.24	10	(84)	13	(0)			
6	11.20	20	2.24	15	(24)	30	(0)			
2	0.28	20	0.14	(50)		(0)				
2	0.56	20	0.14		5	85	95	100		
2	0.56	20	0.14		(95)	93	(5)	100		
2	2.24	20	0.14		(95)	75	(0)	98		
2	2.24	20	0.14		(74)					
2	0.28	20	0.56		40	98	100	100		
2	0.56	20	0.56		(60)	97	(0)	100		
2	0.28	20	0.56		(68)	85	(0)	100		
2	0.56	20	0.56		(100)	93	(0)	100		
2	0.56	20	0.56		(68)	72	(10)	95		
2	0.56	20	0.56		(80)	75	(0)	98		
2	2.24	20	0.56		(74)					
2	2.24	20	0.56		(70)	100	100	100		
2	2.24	20	0.56		(75)	98	(0)	100		
2	2.24	20	0.56		15	97	(0)	100		

7	1.12	20	2.24	80	72	100	100	(0)	(0)	
7	4.48	20	2.24	70	95	100	100	(0)		
7	0.14	20	8.96				95	90	100	90
7	0.56	20	8.96				100	100	100	100
7	1.12	20	8.96	80	72	100	100	(0)	(0)	
7	4.48	20	8.96	100	95	100	100	(0)		
16	0.56	20	0.56	5			25	40		100 90
16	2.24	20	0.56	10	20		85	(38) 95		100 100
16	0.56	20	2.24	20	(50)		5	(11) 40		95 (0) 90
16	2.24	20	2.25	0	20		75	(88) 95		100 100
16	0.56	20	8.96	10	(100)		15	(22) 40		95 (0) 90
16	2.24	20	8.96	25	20		95	(63) 95		100 100
17	1.68	20	0.14	88	88	100	100	(0)		
17	3.36	20	0.15	95	95	100	100	(0)		
17	1.68	20	0.56	78	88	100	100	(0)		
17	3.36	20	0.56	80	95	100	100	(12) (0)		
17	1.68	20	2.25	68	88	98	100	(16) (0)		
17	3.36	20	2.24	88	95	100	100	(23) (2)		
18	0.56	20	0.56				70	78	95	97
18	1.12	20	0.56	30	42	100	100	(11) (3)		
18	2.24	20	0.56				95	97	100	100
18	4.48	20	0.56	80	80	100	100	(3) (0)		
18	0.56	20	2.24				70	79	100	97
18	1.12	20	2.24	45	42	100	100	(100)		
18	2.24	20	2.24				95	97	100	100
18	4.48	20	2.24	40	80	100	100	(3) (0)		
18	0.56	20	8.96				95	78	100	97

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21	0.56	20	0.14						55	68	30	30
21	1.12	20	0.14						(20)	67	40	(0)
21	0.28	20	0.56						(69)	47	5	36
21	0.56	20	0.56						(5)	68	35	(86)
21	1.12	20	0.56						(12)	67	80	30
21	0.28	20	2.24						(71)	47	30	35
21	0.56	20	2.24						(79)	68	45	(15)
21	1.12	20	2.24						(12)	67	30	30
21	0.28	20	8.96						(71)	47	5	(0)
21	0.56	20	8.96						(79)	68	55	(86)
21	1.12	20	8.96							67	70	30
22	1.12	20	0.03	20	42							
22	2.24	20	0.03	40	(53)							
22	0.28	20	0.14		(34)							
22	0.28	20	0.14	10	17							
22	0.56	20	0.14	10	(42)							
22	1.12	20	0.14	24	(17)							
22	1.12	20	0.14	10	98							
22	1.12	20	0.14	10	(75)							
22	1.12	20	0.14		(74)							
22	1.12	20	0.15	25	42							
22	2.24	20	0.14	10	(41)							
22	0.28	20	0.56		(84)							
22	0.28	20	0.56	10	17							
22	0.56	20	0.56	0	(42)							
22	1.12	20	0.56	45	(100)							
22	1.12	20	0.56		(55)							
22	1.12	20	0.56	5	38							
22	1.12	20	0.56	5	(87)							
22	2.24	20	0.56	0	(89)							

10 20 (50)

25 95 (74)

15 20 (25)

40 95 (58)

100 90

100 85

100 100 (0)

100 100 (0)

95 90

75 85 (12)

100 100 (0)

100 100

100 98

100 100 (0)

90 78

65 20

20 78 (75)

20 42 (53)

40 60 (34)

10 17 (42)

24 98 (17)

10 38 (75)

25 42 (41)

10 60 (84)

10 17 (42)

0 12 (100)

45 98 (55)

5 38 (87)

5 42 (89)

0 60

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22	0.28	20	2.24	(100)	10	20	(0)	25	20
22	0.28	20	2.24	10	(50)	100	90		
22	0.56	20	2.24	0		70	85		
22	1.12	20	2.24	(100)	75	78	(18)	60	95
22	1.12	20	2.24	10	(4)	100	100	(37)	
22	1.12	20	2.24	15		100	(0)		
23	0.14	20	0.56	85		55	(0)	55	
23	0.56	20	0.56	99		65	(0)	70	
23	0.03	20	1.12	0		20	(8)		
23	0.03	20	1.12	0		50		10	25
23	0.14	20	1.12	15		45		(60)	83
23	0.14	20	1.12	15	(75)	0		85	
23	0.14	20	2.24	75		0			
23	0.56	20	2.24	95		0			
23	0.03	20	4.48	0		0			
23	0.03	20	4.48	0		30		45	25
23	0.14	20	4.48	5		5		65	83
23	0.14	20	4.48	20		35		(22)	
23	0.14	20	8.96	85		70			
23	0.56	20	8.96	95		75			
24	0.28	20	0.14	35		75			
24	1.12	20	0.14	85		75		75	63
24	0.28	20	0.56	25		95		95	95
24	1.12	20	0.56	90		90		(0)	63
24	0.28	20	2.24	5		50		(21)	95
24	1.12	20	2.24	95		95		(0)	38
25	0.14	20	0.46	0		0		(0)	
25	0.14	20	0.56	45		20		(61)	35

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25	0.28	20	0.56	90	92	(43)	70	60	(62)
25	0.28	20	0.56	75	82	(3)	100	98	
25	0.56	20	0.56			(9)	85	80	95 95
25	0.56	20	0.56				65	85	(0) 77
25	1.12	20	0.56	100	100	(24)	100	100	
25	1.12	20	0.56	100	100	(0)	75	70	
25	0.14	20	1.12			(0)	0	48	55 52
25	0.56	20	1.12				90	95	(100) 95 95
25	0.14	20	2.24			(16)	10	35	(6) (0) 92
25	0.14	20	2.24			(77)	55	60	(72) (30) 38
25	0.28	20	2.24	70	92	(9)	85	60	
25	0.28	20	2.24	95	82	(24)	95	98	
25	0.56	20	2.24			(4)	90	80	95 95
25	0.56	20	2.24			(0)	95	85	(0) 77
25	1.12	20	2.24	100	100		100	100	
25	1.12	20	2.24	100	100	(0)	100	70	
25	0.14	20	4.48			(0)	75	48	80 52
25	0.56	20	4.48			(79)	95	95	95 95
25	0.14	20	8.96			(0)	10	43	(0) 25 92
25	0.14	20	8.96			(77)	95	35	(73) 38
25	0.14	20	8.96				95	60	70 38
25	0.28	20	8.96	90	82		100	98	
25	0.28	20	8.96	95	92		80	60	
25	0.56	20	8.96				85	80	95 95
25	0.56	20	8.96			(0)	95	85	(0) 77
25	1.12	20	8.96	100	100		100	100	
25	1.12	20	8.96	100	100	(0)	70	70	
32	2.24	20	0.56	0	10	(0)	15	55	
32	4.48	20	0.56	10	40	(100)	25	55	
32	2.24	20	2.24	10	10	(75)	0	55	

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28	0.28	20	4.48	(59)		95	98		20	5	
						(10)					
28	1.12	20	4.48			100	100		55	60	
						(4)					
29	0.01	20	1.12					50	27	100	73
						(0)		70	70	95	95
29	0.07	20	1.12					25	(0)	(0)	
								(55)	55		
29	0.28	20	1.12	0	63			100	100		10
				(100)				(0)			(0)
29	0.56	20	1.12				85	95			10
							(11)				(0)
29	1.12	20	1.12				75	95			0
							(22)				(100)
29	1.12	20	1.12	15	93			80	90		
				(84)				(12)			
29	0.01	20	4.48					0	27	85	73
								(100)			
29	0.07	20	4.48					85	70	95	95
								(0)			
29	0.28	20	4.48	0	63			75	55		
				(100)							
29	0.56	20	4.48					100	100		0
								(0)			(100)
29	1.12	20	4.48					100	98		0
								(0)			(100)
29	1.12	20	4.48	10	93			90	90		0
				(90)				(0)			(100)
30	0.01	20	0.14					0	40	0	7
								(100)		(100)	
30	0.03	20	0.14					0	50	0	12
								(100)		(100)	
30	0.01	20	0.56					0	40	30	7
								(100)			
30	0.03	20	0.56					35	50	0	12
								(30)		(100)	
30	1.12	20	1.12								30
								100	100		40
30	1.12	20	1.12	20	93						(25)
				(79)				(0)			
30	4.48	20	1.12					100	100		70
								(0)			50
30	4.48	20	1.12	95	97			100	100		
				(3)				(0)			
30	0.01	20	2.24					45	40	0	7
								(100)		(100)	
30	0.03	20	2.24					50	50	0	12
								(0)		(100)	
30	1.12	20	4.48								0
								100	100		40
30	1.12	20	4.48	35	93						(100)
				(63)				(0)			
30	4.48	20	4.48	65	97						
								100	100		
								(0)			
								100	100		
								(0)			
								100	100		
								(0)			
								100	100		
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								(0)			
								100	100		
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								100	100		
								(0)			
								100	100		
								(0)			
								100	100		
								(0)			

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30	4.48	20	4.48	(33)	90	93	(0)	95	100	0	50	
31	0.14	20	0.56		90	(4)	(5)	75	85	(100)		
31	0.14	20	0.46	0			(12)	60	35	30	32	100
31	0.14	20	0.56					85	60	(7)	95	100
31	0.56	20	0.56					95	90	(0)	95	100
31	0.56	20	0.56	30	75			70	80			
31	0.56	20	0.56	(60)			(13)	85	90	50	50	
31	0.14	20	2.24				(6)	90	85	(0)	40	28
31	0.14	20	2.24					25	60	30	32	95
31	0.14	20	2.24	0			(59)	55	35	(7)	30	32
31	0.14	20	2.24					90	90	(0)	95	100
31	0.56	20	2.24					90	90	(0)	(0)	
31	0.56	20	2.24	5	75			70	80	35	50	
31	0.14	20	8.96	(94)			(13)	65	35	(30)		
31	0.14	20	8.96	0				25	60	30	32	80
31	0.14	20	8.96				(59)	95	85	(7)	30	32
31	0.56	20	8.96					95	90	(6)	90	95
31	0.56	20	8.96					90	90	(0)	95	100
31	0.56	20	8.96	10	75			75	80	(40)	30	50
33	0.56	20	0.56	(87)			(7)	90	80			
33	1.12	20	0.56	35	17			100	95	48	7	8
33	2.24	20	0.56	50	85			100	100	35	17	5
33	2.24	20	0.56	(42)				100	(0)	(0)	83	93
33	0.56	20	2.24	8	17			95	95	0	7	13
33	1.12	20	2.24	(53)				100	(0)	(100)	35	17
33	2.24	20	2.24	(100)				100	(0)	35	17	45
33	0.56	20	8.96	8	17			100	100	50	93	15
33	1.12	20	8.96	(53)				85	95	33	7	10
33	0.009	12	1.12	(20)				100	(11)	25	17	15
19	0.01	12	1.12	15	90			80	90	(20)	85	88
19	0.01	12	1.12	15	90			95	(12)	85	(4)	

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19	0.03	12	1.12	(84)	95	90	95	95	95
19	0.03	12	1.12		95	95	(0)		
19	0.07	12	1.12	90 97	85	90			
19	0.14	12	1.12	(8)	95	95			
19	0.009	12	4.48		75	90	88		
19	0.01	12	4.48	0 90	95	85			
19	0.03	12	4.48	(100)	95	90	95	95	
19	0.03	12	4.48		95	95	(0)		
19	0.07	12	4.48	15 97	95	90			
19	0.14	12	4.48	(85)	100	95			
20	0.004	12	1.12		70	25	5	10	
20	0.004	12	1.12		65	30	35	27	
20	0.004	12	1.12	0 12	10	10			(50)
20	0.009	12	1.12	(100)	10	40			
20	0.009	12	1.12	35 38	80	60	25	42	
20	0.004	12	4.48	(8)	80	35	(41)		
20	0.004	12	4.48		80	25		95	68
20	0.004	12	4.48		0	22		5	10
20	0.004	12	4.48		80	73			(50)
20	0.004	12	4.48	0 12	25	10			
20	0.004	12	4.48	(100)	30	30	40	27	
20	0.009	12	4.48	15 38	35	40			
20	0.009	12	4.48	(61)	50	35		40	68
20	0.009	12	4.48		60	60	40	42	(42)
23	0.03	12	1.12		65	15	(5)	10	25
23	0.03	12	1.12	0	15	75			(60)
23	0.14	12	1.12	0 68	50	75			
23	0.14	12	1.12	(100)	55	50		80	83
23	0.03	12	4.48		40	15		(4)	25
23	0.03	12	4.48	5	20	20		45	25
23	0.14	12	4.48		65	50		75	83

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23	0.14	12	4.48	10	68	(66)	15	75	(10)
25	0.14	12	1.12				30	48	40
25	0.56	12	1.12				75	95	90
25	0.14	12	4.48				15	48	90
25	0.56	12	4.48				0	95	95
26	0.03	12	1.12						85
26	0.07	12	1.12	50	95				100
26	0.07	12	1.12						100
26	0.14	12	1.12						95
26	0.28	12	1.12						100
26	0.28	12	1.12	95	100				100
26	0.03	12	4.48						95
26	0.07	12	4.48	50	95				70
26	0.07	12	4.48						90
26	0.14	12	4.48						95
26	0.28	12	4.48						100
26	0.28	12	4.48	95	100				95
27	0.14	12	1.12	0	12				0
27	0.56	12	1.12	10	53				95
27	0.14	12	4.48	0	12				95
27	0.56	12	4.48	0	53				100
28	0.004	12	1.12						80
28	0.01	12	1.12						95
28	0.01	12	1.12	0	10				80
28	0.07	12	1.12	30	48				95
28	0.28	12	1.12						20

									85	95	95	95	
									(11)	60	(0)		
									100	83		40	
									95	98	95	95	
									(4)	97	(0)	25	68
									100	55		(64)	
									95	95	95	95	
									(0)	60	(0)		
									90	83		0	
									95	98	95	95	
									(4)	97	(0)	80	68
									95	55			
									0	40			
									(100)	65			
									(47)	40			
									(75)	65			
									80	70			
									80	75		15	18
									85	75		(17)	75
									80	88		(14)	
									(10)	98			
									(4)				5

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28	1.12	12	1.12	100	100	15	60				
28	0.004	12	4.48	(0)	75	(75)				10	18
28	0.01	12	4.48	25	43					(45)	75
28	0.01	12	4.48	65	(42)	95				0	(100)
28	0.01	12	4.48	70	(32)	75					
28	0.07	12	4.48	80	(7)	88					
28	0.28	12	4.48	100	(10)	98				5	5
28	1.12	12	4.48	100		100				(0)	60
29	0.01	12	1.12	(0)						(59)	73
29	0.07	12	1.12							10	27
29	0.28	12	1.12							(63)	95
29	0.56	12	1.12							(100)	100
29	1.12	12	1.12							10	55
29	1.12	12	1.12	85	95					(82)	100
29	1.12	12	1.12	95	(11)	95				(0)	100
29	1.12	12	1.12		(0)					65	90
29	0.01	12	4.48							(28)	95
29	0.07	12	4.48							(100)	73
29	0.28	12	4.48							(100)	95
29	0.56	12	4.48							(100)	(0)
29	1.12	12	4.48	80	(16)	95				100	100
29	1.12	12	4.48							(0)	90
29	1.12	12	4.48							100	98
30	1.12	12	1.12	100		100					
30	1.12	12	1.12	95	(0)	100					0
30	4.48	12	1.12	100	(5)	100					(100)
30	4.48	12	1.12	95	(0)	100					40
30	1.12	12	4.48	90	(11)	88					(100)
30	1.12	12	4.48								70
30	1.12	12	4.48								50
30	1.12	12	4.48	90	(3)	88					10
30	1.12	12	4.48								(75)
30	4.48	12	4.48	95	(36)	93					90
30	4.48	12	4.48								50
30	4.48	12	4.48								

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19	0.009	18	1.12	(3)	(0)	90	90	88
19	0.01	18	1.12	5 90	(0)	95	85	
19	0.03	18	1.12	(95)	95	90	95	95
19	0.03	18	1.12		25 30	95	95	(0)
19	0.07	18	1.12	80 97	(17)	90	90	
19	0.14	18	1.12	(18)	60 70	100	95	
19	0.009	18	4.48		(15)	85	90	88
19	0.01	18	4.48	5 90		85	85	(6)
19	0.03	18	4.48	(95)	0 30	100	95	(0)
19	0.03	18	4.48		(100)	95	90	95
19	0.07	18	4.48	20 97		90	90	(0)
19	0.14	18	4.48	(80)	40 70	95	95	
20	0.004	18	1.12		(43)	25	25	0 100
20	0.004	18	1.12		20 22	(0)	10	(100)
20	0.004	18	1.12	0 12	(10)	15	30	
20	0.004	18	1.12	(100)		55	25	27
20	0.009	18	1.12	10 38		20	40	(8)
20	0.009	18	1.12	(74)		25	35	
20	0.009	18	1.12		10 73	65	60	10 68
20	0.009	18	1.12		(87)	15	30	(86)
20	0.004	18	4.48			0	10	42
20	0.004	18	4.48	0 12		0	10	(77)
20	0.004	18	4.48	(100)		85	25	27
20	0.004	18	4.48		0 22	30	60	(26)
20	0.009	18	4.48		(100)	10	35	
20	0.009	18	4.48			10	35	42
20	0.009	18	4.48	30 38		0	40	10 68
26	0.03	18	1.12	(22)	80 73	0	40	(86)
26	0.07	18	1.12			95	95	95
					90 95	100	83	(0)
					(6)			0

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29	1.12	18	1.12	15	93	(0)	95	90	(100)
29	0.01	18	4.48	(84)			25	27	85
29	0.07	18	4.48				85	70	90
29	0.28	18	4.48	10	63		85	55	(6)
29	0.56	18	4.48	(85)		75	100	100	0
29	1.12	18	4.48	30	93	(22)	95	100	10
29	1.12	18	4.48	(68)			95	90	(100)
29	1.12	18	4.48			85	95	98	0
30	1.12	18	1.12	85	93	(11)			12
30	1.12	18	1.12	(9)			95	100	(100)
30	1.12	18	1.12			85	88	100	0
30	4.48	18	1.12	95	97	(4)			40
30	4.48	18	1.12	(3)			95	93	(100)
30	1.12	18	4.48	25	93				50
30	1.12	18	4.48	(74)		90	88		15
30	4.48	18	4.48	95	97				(63)
30	4.48	18	4.48	(3)		95	93		50
19	0.009	24	1.12						
19	0.01	24	1.12	25	90			85	88
19	0.03	24	1.12	(73)		15	30		(4)
19	0.03	24	1.12			(50)			
19	0.07	24	1.12	80	97			95	95
19	0.14	24	1.12	(18)					(0)
19	0.00	24	4.48			75	70		
19	0.01	24	4.48	0	90				88
19	0.03	24	4.48	(100)					
19	0.03	24	4.48			0	30		
19	0.07	24	4.48	15	97	(100)			95
19	0.14	24	4.48	(85)					(0)
19	0.14	24	4.48			30	70		

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26	0.28	24	1.12		85	95	100	95	0	68
26	0.28	24	1.12		(11)		100	55	(100)	
26	0.03	24	4.48				85	95	95	
26	0.07	24	4.48				(11)	60	(0)	
25	0.06	24	4.48		10	95	90	83	0	
26	0.14	24	4.48		(90)		95	98	95	
26	0.28	24	4.48				(4)	97	(0)	25
26	0.28	24	4.48		90	95	100	97	(64)	68
27	0.14	24	1.12				90	55		
27	0.56	24	1.12				15	40		
27	0.14	24	4.48				(63)	65		
27	0.56	24	4.48				(0)	40		
27	0.14	24	4.48				(25)	65		
27	0.56	24	4.48				(0)	70		
28	0.004	24	1.12		10	43	85	75		0
28	0.01	24	1.12		(77)		60	75		(100)
28	0.01	24	1.12				45	75		10
28	0.07	24	1.12				80	88		(87)
28	0.28	24	1.12		40	95	100	98		
28	1.12	24	1.12				(10)	100		
28	0.004	24	4.48				85	70		
28	0.01	24	4.48		20	43	70	75		0
28	0.01	24	4.48		(54)		(7)	75		(100)
28	0.07	24	4.48				80	88		0
28	0.28	24	4.48		50	95	95	98		(100)
28	1.12	24	4.48				(4)	100		
29	0.01	24	1.12				95	100		
29	0.07	24	1.12				(5)	27	90	73
29	0.28	24	1.12				(100)	70	95	95
29	0.28	24	1.12				80	70	95	(0)
29	0.28	24	1.12				70	55		

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29	0.56	24	1.12	(100)	90	95	100	100	10	10	10	10
29	1.12	24	1.12		95	95	(0)	10	(0)	10	12	
29	1.12	24	1.12	30	(0)		80	90		(17)		
29	0.01	24	4.48	(68)			0	27	90	73		
29	0.07	24	4.48				80	70	95	95		
29	0.28	24	4.48	20			70	55	(0)			
29	0.56	24	4.48	(69)	90	95	100	100	10	10	10	
29	1.12	24	4.48		95	95	(0)	98	(0)	10	12	
29	1.12	24	4.48		(0)		95	(4)	(17)			
30	1.12	24	1.12	55			95	100				
30	1.12	24	1.12	(41)	95	100	95	100	(5)	5	40	
30	1.12	24	1.12	(4)	70	88	100	100	(0)	(88)		
30	4.48	24	1.12	95	(21)		100	100	(0)			
30	4.48	24	1.12	(3)	95	93	100	100	(0)	100	50	
30	1.12	24	4.48		85	88	100	100	(0)	0	40	
30	1.12	24	4.48		(4)		100	100		(100)		
30	1.12	24	4.48	35			100	100	(0)			
30	4.48	24	4.48	(63)	95	97	95	100	(0)			
30	4.48	24	4.48	(3)			100	100	(5)			
23	0.03	26	1.12	5	95	93	100	100	(0)	60	50	
23	0.14	26	1.12	35			50	75				
23	0.03	26	4.48	(49)	0		0		(87)			
23	0.14	26	4.48	30			25	75				
23	0.03	26	1.12	(56)			10		(67)			
23	0.03	19	1.12	5			70	15			5	25
23	0.14	19	1.12		0		70	50			(80)	83
23	0.14	19	1.12		20	58	70	50			95	
23	0.14	19	1.12	15	(66)		55	75				
23	0.03	19	4.48	(78)			50	(27)				
23	0.03	19	4.48	0	0		60	15			0	25
23	0.14	19	4.48		10	58	40	50			(100)	83
					(83)		(20)					

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23	0.14	19	4.48	35	68			40	75				
25	0.14	19	1.12	(49)		20	23	65	(47)	48	80	52	
25	0.56	19	1.12			95	95	95	95	95	95	95	
25	0.14	19	4.48			80	23	60	(0)	48	(0)	52	
25	0.56	19	4.48			90	95	95	95	95	95	95	
27	0.14	19	1.12	0	12	(6)		60	(0)	40	(0)		
27	0.56	19	1.12	70	53			80		65			
27	0.14	19	4.48	0	12			60		40			
27	0.56	19	4.48	85	53			90		65			
19	0.009	23	1.12					90		90		88	
19	0.01	23	1.12	10	90			85	(0)	85			
19	0.03	23	1.12			0	30	95	(0)	95			
19	0.03	23	1.12			(100)		95	(0)	90			
19	0.07	23	1.12	30	97			80		90			
19	0.14	23	1.12	(70)		75	70	95	(12)	95			
19	0.009	23	4.48					90	(0)	90		88	
19	0.01	23	4.48	0	90			90	(0)	85			
19	0.03	23	4.48					90	(0)	90			
19	0.03	23	4.48			0	30	100	(0)	95			
19	0.07	23	4.48	35	97			100		90			
19	0.14	23	4.48	(64)		30	70	100		95			
20	0.004	23	1.12			10	22	0	25	0	0	10	
20	0.004	23	1.12			(58)		0	(100)	30	(100)		
20	0.004	23	1.12			(55)		0	30	20	27		
20	0.004	23	1.12	0	12			0	(100)	(26)			
20	0.009	23	1.12	10	38			0	(100)	10			
20	0.009	23	1.12	(74)				40	(100)	40			
20	0.009	23	1.12			65	73	90	(0)	35	60	68	
20	0.009	23	1.12			(11)		20	60	55	42	(12)	
20	0.004	23	4.48			0	22	35	(67)	25	5	10	
						(100)						(50)	

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20	0.004	23	4.48					30	30	0	27
								(0)		(100)	
20	0.004	23	4.48	0	12			0	10		
				(100)				(100)			
20	0.009	23	4.48	15	38			60	40		
				(61)							
20	0.009	23	4.48					0	60	75	42
								(100)			
20	0.009	23	4.48	60	73			65	35	15	68
				(11)							(78)
23	0.03	23	1.12	0				10	15	10	25
								(34)			(60)
23	0.03	23	1.12	0				0			
								35	75		
23	0.14	23	1.12	5	68			(54)			
				(93)				65	50	80	83
23	0.14	23	1.12	55	58			30	15	5	25
				(6)						(4)	
23	0.03	23	4.48	0				30	15	5	25
										(80)	
23	0.03	23	4.48	0				0			
								55	75		
23	0.14	23	4.48	15	68			(27)			
				(78)				15	50	85	83
23	0.14	23	4.48	30	58			(70)		75	52
				(49)				0	48	95	95
25	0.14	23	1.12	25	23			(100)		95	95
								85	95	70	52
25	0.56	23	1.12	90	95			(11)		(0)	
				(6)				0	48	95	95
25	0.14	23	4.48	50	23			(100)		95	95
								90	95	95	95
25	0.56	23	4.48	95	95			(6)		(0)	
				(0)							
26	0.03	23	1.12						95	95	95
									95	95	95
26	0.07	23	1.12	10	95				95	95	95
				(90)					60	(0)	
26	0.07	23	1.12	65	95				83		0
				(32)					100		
26	0.14	23	1.12	85	95				98	95	95
				(11)					100	(0)	5
26	0.28	23	1.12	0	95				95		68
									100		(93)
26	0.28	23	1.12	90	100				55		
				(10)					90	95	95
26	0.03	23	4.48						95	95	95
									60	(0)	0
26	0.07	23	4.48	0	95				90	83	
				(100)					90		
26	0.07	23	4.48						0	60	
									(100)		
26	0.14	23	4.48	15	95				95	98	95
				(85)					95	(4)	(0)
26	0.28	23	4.48	80	95				90	97	0
									90		68

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27	0.56	22	1.12	75	53	(59)	65	43	70	65	5	18
27	0.14	22	4.48	0	12		55		55	40		(73)
27	0.56	22	4.48	30	53	(100)	80		80	65		
28	0.004	22	1.12			(44)	65	43	90	70	5	18
28	0.01	22	1.12	5	10	(50)	80		80	75		
28	0.01	22	1.12				80	95	85	75	70	75
28	0.07	22	1.12	10	48	(80)	80	(16)	80	88		(7)
28	0.28	22	1.12				95		95	98	20	5
28	1.12	22	1.12				100		100	100	80	60
28	0.004	22	4.48				70	43	70	70		0
28	0.01	22	4.48				40	(7)	80	75		18
28	0.01	22	4.48				90	95	80	75		(100)
28	0.01	22	4.48	5	10		80	(6)	80	75		75
28	0.07	22	4.48	15	48	(69)	95		95	88		
28	0.28	22	4.48				100		100	98	25	5
28	1.12	22	4.48				100		100	100	55	60
29	0.01	22	1.12						80	27	90	73
29	0.07	22	1.12						90	70	95	95
29	0.28	22	1.12	60	63	(5)			60	55	(0)	
29	0.56	22	1.12				95	95	100	100		0
29	1.12	22	1.12				95	(0)	100	(0)		10
29	1.12	22	1.12						100	98	15	12
29	0.01	22	4.48				95	90	95	90		73
29	0.07	22	4.48				0	27	0	27	95	(100)
29	0.28	22	4.48				0	70	0	70	95	95
29	0.28	22	4.48	55	63	(13)	60		60	(100)	(0)	
29	0.56	22	4.48				95	95	100	100		20
29	1.12	22	4.48				95	(0)	90	(0)		10
29	1.12	22	4.48				95	(0)	90	98	10	12
29	1.12	22	4.48						100	(9)		(17)
29	1.12	22	4.48	95	93		95	100	95	100		
30	1.12	22	1.12	95	93				95	100		
30	1.12	22	1.12				80	88	100	(5)	35	40

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20	0.009	21	4.48		85	73	(17)	35	(45)	95	68
20	0.009	21	4.48	5	25		40				
20	0.009	21	4.48	(87)	(38)		60	55	42		
23	0.03	21	1.12	0	0		15	0	0	25	(100)
23	0.03	21	1.12		40		75				
23	0.14	21	1.12	35	50		50				
23	0.14	21	1.12	(49)	80	58	50		80	83	
23	0.03	21	4.48		15		15		5	25	
23	0.03	21	4.48	0	0		0				
23	0.14	21	4.48		40	58	50		80	83	
23	0.14	21	4.48		40	(49)	75				
23	0.14	21	4.48	0	40		48				
25	0.14	21	1.12	(100)	70	23	48		90	52	
25	0.56	21	1.12		85	95	95		95	95	
25	0.14	21	4.48		65	23	(11)			0	
25	0.56	21	4.48		20	95	95		75	52	
26	0.03	21	1.12		0	0	(6)		95	0	
26	0.07	21	1.12		90	95		95	0	45	
26	0.07	21	1.12	45	95	(6)		100	60		
26	0.14	21	1.12	(53)				100	98	95	
26	0.28	21	1.12		95	95		100	97	75	68
26	0.28	21	1.12	90	0			95	55		
26	0.03	21	4.48	(10)	95	95		95	95	95	
26	0.07	21	4.48		65	95		100	83	5	
26	0.07	21	4.48		65	(32)		30	60		
26	0.14	21	4.48	(74)	95	95		100	98	95	
26	0.28	21	4.48		95	95		100	97	55	68
26	0.28	21	4.48		95	(0)		100	55		(20)
27	0.14	21	1.12	0	70		40				

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20	0.009	31	1.12	30	38	(5)	(100)	40	(27)
23	0.03	31	1.12	0	(22)		(25)		
23	0.14	31	1.12	10	68		75		
23	0.03	31	4.48	0	(86)		(47)		
23	0.14	31	4.48	45	68		75		
28	0.004	31	1.12		(34)	65	(60)	35	18
28	0.01	31	1.12	5	10		75		
28	0.01	31	1.12		(50)	90	75	70	75
28	0.07	31	1.12	15	48	(6)	88	(7)	
28	0.28	31	1.12		(69)	85	(4)	0	5
28	1.12	31	1.12			95	(4)	(100)	60
29	0.01	31	1.12			100	(0)	45	73
29	0.07	31	1.12					27	100
29	0.28	31	1.12	0	63		(100)	70	95
29	0.56	31	1.12		(100)	95	95	70	95
29	1.12	31	1.12			70	(0)	55	(0)
29	1.12	31	1.12	45	93		100	100	0
30	1.12	31	1.12	75	93		(0)	100	10
30	4.48	31	1.12		(20)	95	(0)	98	40
30	4.48	31	1.12	95	97		95	90	5
19	0.009	34	1.12		(3)		(0)	90	88
19	0.01	34	1.12	35	90		(0)	85	
19	0.03	34	1.12		(62)	10	(24)	95	
19	0.03	34	1.12				(0)	90	
19	0.07	34	1.12	70	97	(67)	(0)	90	95
19	0.14	34	1.12		(28)		(28)	95	
19	0.009	34	4.48			90	(0)	90	88

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26	0.03	34	1.12	(6)	(0)	85	95	95	95	(0)
26	0.07	34	1.12	80	95	(11)	83	(0)	20	
26	0.07	34	1.12	(16)		90	60			
26	0.14	34	1.12			95	98	95		
26	0.28	34	1.12	95	95	(4)	97	(0)	60	68
26	0.28	34	1.12	(0)		80	55			(12)
26	0.03	34	4.48			95	95	95		
26	0.07	34	4.48	80	80	(0)	60	(0)		
26	0.07	34	4.48	90	95		83		0	
26	0.14	34	4.48	(6)		100	98	95		
26	0.28	34	4.48	95	95		97	(0)	50	68
26	0.28	34	4.48	(0)		80	55			(27)
27	0.14	34	1.12			70	40			
27	0.56	34	1.12			65	65			
27	0.14	34	4.48			55	(0)			
27	0.56	34	1.12	20	43	75	65		10	18
28	0.01	34	1.12	(54)	95	80	75		35	75
28	0.01	34	1.12	(27)		80	75			(54)
28	0.07	34	1.12			75	88			
28	0.28	34	1.12			100	(15)	5	5	
28	1.12	34	1.12			100	(0)	20	(0)	60
28	0.004	34	4.48	30	43	85	70		(67)	0
28	0.01	34	4.48	(31)	95	90	75			(100)
28	0.01	34	4.48	(6)		60	75			(100)
28	0.07	34	4.48			85	(20)			
28	0.28	34	4.48			95	(4)			
28	0.28	34	4.48			95	98		10	5

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19	0.01	35	4.48	40	90	95	85					
19	0.03	35	4.48	(56)		95	90			95	95	
19	0.03	35	4.48			95	95		(0)			
19	0.07	35	4.48	95	97	95	90					
19	0.14	35	4.48	(3)		95	95					
20	0.004	35	1.12			10	25	15	10			
20	0.004	35	1.12	10	12	0	10					
20	0.004	35	1.12	(17)		0	30			5	27	
20	0.009	35	1.12			90	35	80	68	(82)		
20	0.009	35	1.12			25	60	25	42			
20	0.009	35	1.12	60	38	35	40		(41)			
20	0.004	35	4.48	30	12	35	30	30	27			
20	0.004	35	4.48			25	10					
20	0.004	35	4.48			90	25	50	10			
20	0.009	35	4.48	45	38	80	40					
20	0.009	35	4.48			90	35	85	68			
20	0.009	35	4.48			40	60	45	42			
23	0.03	35	1.12			60	15	50	25			
23	0.03	35	1.12	15		50						
23	0.14	35	1.12	15	68	25	75					
23	0.14	35	1.12	(78)								
23	0.03	35	4.48			55	58	90	83			
23	0.03	35	4.48	6		15	15	35	25			
23	0.03	35	4.48	0		35		80	83			
23	0.14	35	4.48			10	50					
23	0.14	35	4.48	(83)					(4)			
23	0.14	35	4.48	45	68	55	75					
25	0.14	35	1.12	(34)		0	48	90	52			
25	0.56	35	1.12			20	23					
25	0.14	35	4.48			95	95	95	95			
25	0.14	35	4.48			35	23	90	52			
25	0.56	35	4.48			100	95	95	95			
26	0.03	35	1.12					90	95	95	95	(0)
26	0.07	35	1.12			90	95	100	83	(6)	(0)	25
26	0.07	35	1.12	90	95			70	60			

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26	0.14	35	1.12	(6)	95	95	100	98	95	95	90	68
26	0.28	35	1.12		(0)		100	97	(0)		90	68
26	0.28	35	1.12	100	100	85	55	55				
26	0.03	35	4.48	(0)		90	95	95	95	95		
26	0.07	35	4.48		85	(11)	95	(6)	(0)		0	
26	0.07	35	4.48	65	95		60	(100)				
26	0.14	35	4.48	(32)		95	98	100	95	95		
26	0.28	35	4.48		85	(11)	95	(4)			40	68
26	0.28	35	4.48				97	(3)			(42)	
26	0.28	35	4.48	95	100		55	(10)				
27	0.14	35	1.12	(5)		0	40					
27	0.56	35	1.12	(100)		(100)						
27	0.14	35	4.48	70	53	75	65					
27	0.56	35	4.48	0	12	30	40					
27	0.56	35	4.48	(100)		(25)						
27	0.56	35	4.48	5	53	70	65					
28	0.004	35	1.12	(91)			70					
28	0.01	35	1.12		10	25	43				10	18
28	0.01	35	1.12	(0)		(42)					(45)	
28	0.01	35	1.12		10	80	95				10	75
28	0.07	35	1.12	10	48	(16)					(87)	
28	0.28	35	1.12	(80)		80	75					
28	0.28	35	1.12			80	88					
28	1.12	35	1.12			100	98					
28	0.004	35	4.48			100	98			0	5	
28	0.01	35	4.48			100	100			(100)	60	
28	0.01	35	4.48			90	70			(92)		0
28	0.01	35	4.48	10	10	30	43					18
28	0.01	35	4.48	(0)		(31)						(100)
28	0.07	35	4.48	25	48	80	95				35	75
28	0.28	35	4.48	(48)		(16)					(54)	
28	1.12	35	4.48			80	75					
28	0.28	35	4.48			100	98					
28	1.12	35	4.48			100	100					
29	0.01	35	1.12			0	27			(17)	73	
29	0.07	35	1.12			15	70			(100)	95	95
										(79)		(0)

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29	0.28	35	1.12	30	63				80	55			
29	0.56	35	1.12		(53)				100	100		0	10
29	1.12	35	1.12						100	(0)		(100)	12
29	1.12	35	1.12	80	93				80	90		25	
29	0.01	35	4.48		(14)				0	(12)		73	
29	0.07	35	4.48						70	70		95	
29	0.28	35	4.48	5	63				60	(0)		(0)	
29	0.56	35	4.48		(93)				100	100		15	10
29	1.12	35	4.48	55	93				100	(0)			
29	1.12	35	4.48		(41)				100	90			
30	1.12	35	1.12	95	93				100	98		5	12
30	1.12	35	1.12						95	100		(59)	
30	1.12	35	1.12						100	100		15	40
30	4.48	35	1.12	100	97				95	100		(63)	
30	4.48	35	1.12						100	100			
30	1.12	35	4.48	50	93				100	(0)			
30	1.12	35	4.48		(47)				100	(0)			
30	4.48	35	4.48						60	88		10	40
30	4.48	35	4.48						95	93		(75)	
30	4.48	35	4.48	95	97				100	(0)		55	50
2	0.28	32	0.14		(3)				100	(0)			
2	0.56	32	0.14						0	85	95	100	
2	2.24	32	0.14						(100)	93	95	100	
2	0.28	32	0.56						35	97	100	100	
2	0.56	32	0.56						10	85	95	100	
2	2.24	32	0.56						10	(89)	95	100	
2	0.28	32	2.24						45	(90)	95	100	
2	0.56	32	2.24						10	(54)	95	100	
2	2.24	32	2.24						20	(89)	93	100	100
2	2.24	32	2.24						15	(79)	97	100	100

-continued

28	1.12	32	1.12	100	100	15	60		
29	0.01	32	1.12	(0)	0	27	(75)	80	73
29	0.07	32	1.12		(100)	70	95	95	
29	0.28	32	1.12		(100)	55	(0)		
29	0.56	32	1.12		0	63			
29	1.12	32	1.12		(100)				
29	1.12	32	1.12		75	95			0 10
29	1.12	32	1.12		(22)	95			(100)
29	1.12	32	1.12		90	95			15 12
29	1.12	32	1.12		(6)				
29	1.12	32	1.12		100	100			
30	1.12	32	1.12		0	93			
30	1.12	32	1.12		(100)				
30	1.12	32	1.12		30	93			
30	1.12	32	1.12		(68)				
30	4.48	32	1.12		10	88			0 40
30	4.48	32	1.12		(89)				(100)
30	4.48	32	1.12		95	93			95 50
30	4.48	32	1.12		90	97			
2	0.56	36	0.56		(8)				
2	2.24	36	0.56		75	72	100	95	
2	0.56	36	2.24		80	100	95	100	
2	2.24	36	2.24		(20)		(5)		
2	0.56	36	2.24		65	72	100	95	
2	2.24	36	2.24		(10)				
2	0.56	36	8.96		70	100	100	100	
2	2.24	36	8.96		(30)		(0)		
2	0.03	36	1.12		25	72	90	95	
2	0.14	36	1.12		(66)		(6)		
2	0.03	36	4.48		85	100	100	100	
23	0.03	36	4.48		(15)		(0)		
23	0.14	36	4.48		0				
23	0.14	36	4.48		45	58			30 25
23	0.14	36	4.48		(23)				50 83
23	0.14	36	4.48		0				(40)
23	0.14	36	4.48		70	58			(60)
23	0.14	36	1.12		20	23			90 83
23	0.56	36	1.12		(14)				15 52
25	0.14	36	4.48		70	95			(72)
25	0.56	36	4.48		(27)				95 95
27	0.14	36	1.12		80	23			(0)
27	0.56	36	1.12		95	95			85 52
27	0.14	36	1.12		(0)				95 95
27	0.56	36	4.48		25	40			(0)
27	0.14	36	4.48		(38)				
27	0.56	36	4.48		80	65			
27	0.56	36	4.48		25	40			
27	0.56	36	4.48		(38)				
27	0.56	36	4.48		80	65			

-continued

2	0.56	33	0.56					90	(0)	98	100	(0)	100
2	2.24	33	0.56					95	(9)	98	100	(0)	100
2	0.56	3	0.14	0	18	100	99		(4)				
2	2.24	3	0.14	15	57	100	100						
2	0.56	3	0.56	0	18	100	99						
2	2.24	3	0.56	0	57	100	100						
2	0.56	3	2.24	0	18	100	99						
2	2.24	3	2.24	0	57	100	100						
2	0.56	34	0.14	0	18	100	99						
2	2.24	34	0.14	60	57	95	100						
2	0.56	34	0.56	0	18	95	99						
2	2.24	34	0.56	30	57	100	100						
2	0.56	34	2.24	0	18	100	99						
2	2.24	34	2.24	35	57	100	100						
2	0.56	35	0.14	0	18	90	99						
2	2.24	35	0.14	0	57	100	100						
2	0.56	35	0.56	5	18	100	99						
2	2.24	35	0.56	40	57	100	100						
2	0.56	35	2.24	20	18	100	99						
2	2.24	35	2.24	60	57	100	100						
2	0.28	3	0.03	100	100	28	62						
2	—	25	2.24	(0)			(55)			0	—	—	0
2	2.24	25	0.14					50		80	100	100	100
2	0.56	25	0.14					0		42	100	100	100
2	2.24	25	0.56					10		80	100	100	100
2	0.56	25	0.56					10		42	100	100	100
2	2.24	25	2.24					5		80	100	100	100
2	0.56	25	2.24					0		42	100	100	100

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EXAMPLE 44

The procedure described in Example 42 was used to conduct tests for the antidotal activity of the compound of Example 3 (oxazolidine, 3-(dichloroacetyl)-5-(2-furanyl)-2,2-dimethyl-) with a thiocarbamate herbicide

(2,3,3-)trichloroalkyl-N,N-diisopropylthiocarbamate, (triallate); Herbicide No. 1) and a herbicidal pyridine compound (3-pyridinecarboxylic acid, 2-(difluoromethyl)-5-(4,5-dihydro-2-thiazolyl)-4-(2-methylpropyl)-6-trifluoromethyl)-, methyl ester; Herbicide No. 24). Results are reported in Table 7.

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EXAMPLE 45

This example describes the preparation of the herbicidal compound 5-(trifluoromethyl)-4-chloro-3-(3'-[1-ethoxycarbonyl]-ethoxy-4'-nitrophenoxy)-1-methylpyrazole (Herbicide No. 34), a heterocycyl phenyl ether compound representative of the class.

961 g (4.80 mol) of 5-trifluoromethyl-4-chloro-3-hydroxy-1-methylpyrazol, 1317 g (5.12 mol) of ethyl 2-(5-fluoro-2-nitrophenoxy)propanoate, and 380 g (2.75 mol) of potassium carbonate were stirred with 6000 ml of DMSO at 70° C. for 20 hours. Another 100 g (0.72 mol) of potassium carbonate was added. After another 16 hours at 70° C. another 163 g (1.18 mol) of potassium carbonate was added. After stirring another 6 hours at 70° C., the product was isolated from the mixture by extracting twice with ether and combining the ether extracts, washing same 2× with brine, dried with MgSO₄, decolorized with charcoal, filtered and rotovaped to give a black oil. Purification by silica gel chromatography gave 1733 g of a dark oil. Further, purification by vacuum distillation (molecular still) gave a reddish orange solid, m.p. 40°–44° C.

Elemental Analysis for C ₁₆ H ₁₅ F ₃ Cl ₁ N ₃ O ₆			
	C	H	N
Calculated	43.90	3.45	9.60
Found	43.96	3.50	9.58

The above first-names intermediate, (5-trifluoromethyl)-4-chloro-3-hydroxy-1-methylpyrazole (m.p. 136°–140° C.) may be prepared by various means. A preferred process comprises bubbling ammonia gas through ethyl 4,4,4-trifluoroacetate at an elevated temperature of about 55°–85° C. while removing water to form 3-amino-4,4,4-trifluoro-2-butenic acid ethyl ester. This ester is then reacted directly with methylhydrazine at about 60°–100° C. to form the 3- and 5-hydroxy isomers mixture of the intermediate pyrazole. The desired 3- isomer may be separated by stirring the isomer mixture in an aqueous solution of sodium bicarbonate wherein the 5-isomer is dissolved while the 3-isomer remains in suspension and is readily separated by filtration. The 5-trifluoromethyl-3-hydroxy methylpyrazole product can be then chlorinated in the 4-position using a suitable chlorinating agent such as chlorine or sulfuryl chloride in a suitable solvent such as acetonitrile or diethyl ether, then poured into ice water containing sodium carbonate, washed with water and extracted with ether, and purified, e.g., by recrystallization.

The above intermediate, ethyl 2-(5-fluoro-2-nitrophenoxy) propanoate can be prepared from 2-hydroxy-4-fluoronitrobenzene which is commercially available or by reacting 2,4-difluoronitrobenzene with sodium hydroxide in dimethylsulfoxide (DMSO) and extracting the product from water with hexane. 2-hydroxy-4-fluoronitrobenzene is reacted with a haloalkylcarboxylate (e.g., ethyl 2-bromo- or 2-chloropropionate in a suitable solvent (e.g., acetone, acetonitrile, DMF or DMSO) in the presence of a base (e.g., KOH or NaOH) for an extended period (e.g., 3 days), then isolating the nitrobenzene product by standard laboratory techniques.

EXAMPLE 46

This example describes a greenhouse test for the post-emergence activity of the compound of Example 3 in combination with the Herbicide No. 34, the compound of the preceding example. The test plants involved were soybeans as the crops and the weeds morningglory and velvetleaf.

The procedure used in conducting the tests of this example involved planting the test plants in separate pots and growing the soybeans to the 1.5 trifoliolate stage, then applying the herbicide and tank-mixtures of the herbicide and antidote to the plant canopy (foliage) surface with the track sprayer delivering 20 gal. (75.71 liters) of liquid per acre (0.405 ha). All plants were sprayed when the soybeans reached the 1.5 trifoliolate leaf stage. Observations of herbicidal activity were made thirteen (13) days after spraying the plants. Results are shown in Table 8.

TABLE 8

Treatment Rate				
(Kg/Ha)				
Ex./Anti-dote #3	Herb #34	Soybeans	Morning glory	Velvet leaf
0	0	0.00	0.00	0.00
0	0.56	21	98	98
0	2.24	43	99	99
.035	0	5	10	1
.035	.56	20	98	98
.035	2.24	41	98	98
.07	0	9	14	1
.07	.56	16	98	99
.07	2.24	21	99	99
.14	0	5	8	0
.14	.56	16	95	98
.14	2.24	21	95	97
0.28	0	8	15	1
0.28	0.56	11	89	98
0.28	2.24	38	98	99
0.56	0	5	15	1
0.56	0.56	19	98	99
0.56	2.24	31	99	99

As noted in the data in Table 8, soybean injury was reduced from about 21% when treated with 0.56 kg/ha of herbicide alone to about 11% when, at the same herbicide rate, 0.28 kg/ha of antidote was present. Weed control was excellent for morningglory and velvetleaf. The data also indicates that for Antidote No. 3 rates of 0.28 kg/ha soybean injury due to Herbicide No. 34 was excessive. It was also observed that even at the higher antidote rates, at the time of observation all soybeans were actively growing out of their injury, whereas both weeds were mostly dead.

EXAMPLE 47

This example describes a field test evaluation of the postemergence activity of the same herbicide/antidote combination used in the greenhouse tests of Example 46.

Velvetleaf and morningglory seed (3.5 gal.; 13.251) were blended together and seeded with a cyclone spreader (setting 1.5) mounted on the tri-motorcycle (spacing every 25 ft; 7.62 meters) and incorporated into the soil (silt loam) with a culti-packer to a depth of 1.0 in. (2.54 cm). A four-row John Deere Maxi-merge planter with 20 in. (50.8 cm) row spacings was used to plant 4 rows of the soybeans (Williams) 1.0 in. (2.54 cm) in the soil.

No overhead irrigation was employed in this test as soil conditions, i.e., hot and humid with excellent soil moisture, were extremely favorable for fast soybean growth.

The soybeans were allowed to grow to the 1.5 trifoliolate stage (two weeks) at which time the herbicide alone and tank mixtures of the herbicide/antidote combination were applied to the plant canopy surface with a small plot tractor-mounted sprayer delivering 30 gal. (113.56 l) of liquid per acre (0.405 ha). A randomized block design with three replicates of each treatment was used. Each plot was 12 ft × 25 ft (3.66 m × 7.62 m).

Evaluations ("Eval") of herbicidal activity were made 5 and 14 days after treatment (DAT). Results are shown in Table 9, in which the following symbols are used to represent plants.

TABLE 9

Eval. (DAT)	Herb. No. 4	Ex./Anti-dote #3	Treatment Rate (Kg/Ha)				
			% Inhibition (Avg. 3 reps)				
			S	MG	VL	P	CW
5	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0
5	0.0175	0	15	75	83	93	96
14	0.0175	0	10	65	85	87	96
5	0.035	0	20	85	92	95	96
14	0.035	0	18	77	93	95	97
5	0.07	0	27	92	97	97	99
14	0.07	0	23	87	99	95	98
5	0.07	0.28	15	90	96	97	9
14	0.07	0.28	12	90	93	93	98

S = Soybeans
MG = Morningglory
VL = Velvetleaf
P = Purslane
CW = Carpetweed

The results of the above field test indicate that Herbicide No. 34 is extremely active against noxious weeds even at rates as low as 0.0175 kg/ha (1/64 lb/ac). At 0.035 kg/ha (1/32 lb/ac) and without an antidote, soybean injury is slightly above commercially-desirable levels (15%), whereas weed control is excellent. At 0.07 kg/ha (1/6 lb/ac) Herbicide No. 34 caused injury to soybeans above the commercially-desirable level. However, when 0.28 kg/ha (1/4 lb/ac) of Antidote No. 3 was mixed with 0.07 kg/ha of the herbicide, soybean injury was reduced to commercially-acceptable levels with substantially complete weed control.

Symptomology on the soybeans indicated some initial brown spotting present, but no further development of herbicide injury (severe burn). Results were more dramatic at 5 DAT than at 14 DAT when all soybean plants appeared to outgrow injury.

EXAMPLE 48

Using the same procedure described in Example 45, but substituting n-butyl 2-(5-fluoro-2-nitrophenoxy) propanoate as the starting alkoxy carbonyl alkoxy nitrobenzene, there was prepared 5-trifluoromethyl-4-chloro-3-(3'-[1-n-butoxycarbonyl] ethoxy-4'-nitrophenoxy)-1-methylpyrazol, N_D²⁵2.5102. (Herbicide No. 35)

EXAMPLE 49

Following the procedure described in Example 46, postemergence tests were conducted in the greenhouse to determine the antidotal activity of the compounds of Examples 3 and 20 (Antidote Nos. 3 and 20, respectively) against the heterocycl phenyl ether prepared in the preceding example, i.e., Herbicide No. 35, in soy-

beans; no weeds were present in this test. Observations of herbicidal activity on the whole plant were made ten days after treatment (DAT); observation of initial activity at the first trifoliolate stage was made the day following treatment. Test results are shown in Table 10.

TABLE 10

Ex./Anti-Dote No.	Rate (Kg/Ha)	Herb. #35 (Kg/Ha)	% Soybean Injury (Avg. 2 reps)	
			1 DAT	10 DAT
—	—	0.56	80	50
—	—	2.24	90	50
3	2.24	—	15	5
3	0.14	0.56	95	50
3	0.14	2.24	90	40
3	0.56	0.56	80	35
3	0.56	2.24	90	35
3	2.24	0.56	90	35
3	2.24	2.24	90	35
20	2.24	—	20	10
20	0.14	0.56	90	28
20	0.14	2.24	90	25
20	0.56	0.56	80	30
20	0.56	2.24	90	35
20	2.24	0.56	85	25
20	2.24	2.24	95	35

Neither antidote reduced initial leaf burn caused by Herbicide No. 35; however, regrowth was enhanced substantially after ten days, particularly when treated with Antidote No. 20. The 50% injury caused by the herbicide 10 DAT at 0.56 Kg/ha was reduced to 28% by 0.14 kg/ha of Antidote No. 20. Similar reductions in soybean injury were effected by other herbicide/antidote ratios with Antidote No. 20 and to a lesser extent with Antidote No. 3.

The above specifically mentioned herbicidal compounds are intended merely as exemplary of the classes of herbicides which they represent. However, it is expressly contemplated that many other herbicidal compounds analogous to those represented herein having a variety of equivalent radicals substituted on the central nucleus may similarly be safened to various crop plants to a greater or lesser extent with the antidotal compounds of this invention. For example, other α -haloacetanilide compounds useful as herbicides are described in U.S. Pat. Nos. 3,442,945, 3,547,620, 3,830,841, 3,901,768, 4,517,011, 4,601,745, 4,319,918, 3,586,496 and 3,574,746.

Herbicidally-useful thiocarbamate compounds are described in U.S. Pat. Nos. 2,913,327, 3,330,643 and 3,330,821.

Other herbicidal pyridine compounds are described in U.S. Pat. No. 4,692,184 and copending U.S. patent Ser. Nos. 07/134,231 and 07/134,232, now U.S. Pat. No. 4,826,532 both of common assignment herewith.

Herbicidally-useful heterocycl phenyl ethers (especially pyrazolyl aryl ethers) are described in U.S. Pat. No. 4,298,749 and copending U.S. patent Ser. Nos. 07/175,460, entitled "Substituted 3-(4-Nitrophenoxy) Pyrazoles and Their Use As Herbicides", of common assignment herewith.

Herbicidal diphenyl ethers and nitrophenyl ethers include 2,4-dichlorophenyl 4'-nitrophenyl ether ("nitrofen"), 2-chloro-1-(3'-ethoxy-4'-nitrophenoxy)-4-trifluoromethylbenzene ("Oxyfluorfen"), 2',4'-dichlorophenyl 3-methoxy-4-nitrophenyl ether ("Chlormethoxynil"), methyl 2-[4'-(2'', 4''-dichlorophenoxy)-phenoxy]-propionate, N-(2'-phenoxyethyl)-2-[5'-(2''-chloro-4''-trifluoromethylphenoxy)-phenoxy]-

propionamide, 2-methoxyethyl 2-[nitro-5-(2-(2-chloro-4-trifluoromethylphenoxy)-phenoxy)-propionate and 2-chloro-4-trifluoromethylphenyl 3'-oxazolin-2'-yl-4'-nitrophenylether.

Another generic class of agrichemically-important herbicidal compounds specifically contemplated for use in combination with the antidotal compounds of this invention are the ureas and sulfonylurea derivatives. Important herbicidal ureas include 1-(benzothiazol-2-yl)-1,3-dimethylurea; phenylureas, for example: 3-(3-chloro-p-tolyl)-1,1-dimethylurea ("chlorotoluron"), 1,1-dimethyl-3-(α,α,α -trifluorom-tolyl)urea ("fluometuron"), 3-(4-bromo-3-chlorophenyl)methoxy-1-methylurea ("chlorbromuron"), 3-(4-bromophenyl)-1-methoxy-1-methylurea ("metobromuron"), 3-(3,4-dichlorophenyl)-1-methoxy-1-methylurea ("linuron"), 3-(4-chlorophenyl)-1-methoxy-1-methylurea ("monolinuron"), 3-(3,4-dichlorophenyl)-1,1-dimethylurea ("diuron"), 3-(4-chlorophenyl)-1,1-dimethylurea ("monuron") and 3-(3-chloro-4-methoxyphenyl)-1,1-dimethylurea ("metoxuron");

Important herbicidal sulfonylureas specifically contemplated as useful in compositions with the antidotal compounds of this invention include those disclosed in the following patents: U.S. Pat. Nos. 4,383,113, 4,127,405, 4,481,029, 4,514,212, 4,420,325, 4,638,004, 4,675,046, 4,681,620, 4,741,760, 4,723,123, 4,411,690, 4,718,937, 4,620,868, 4,668,277, 4,592,776, 4,666,508, 4,696,695, 4,731,446 and 4,668,279 and EP Numbers 084224, 173312, 190105, 256396, 264021, 264672, 142152, 244847, 176304, 177163, 187470, 187489, 184385, 232067, 234352, 189069, 224842, 249938, 246984 and 246984.

Among the herbicidal sulfonylureas disclosed in one or more of the above patents which are of particular interest are mentioned the species N-[(4-methoxy-6-methylpyrimidin-2-yl)aminocarbonyl]-3-chloro-4-methoxycarbonyl-1-methylpyrazole-5-sulfonamide, N-[(4,6-dimethoxypyrimidin-2-yl)aminocarbonyl]-3-chloro-4-methoxycarbonyl-1-methylpyrazole-5-sulfonamide, N-[(4-methoxy-6-methylpyrimidin-2-yl)aminocarbonyl]-3-chloro-4-ethoxycarbonyl-1-methylpyrazole-5-sulfonamide, N-[(4,6-dimethoxypyrimidin-2-yl)aminocarbonyl]-3-chloro-4-ethoxycarbonyl-1-methylpyrazole-5-sulfonamide, N-[(4-methoxy-6-methylpyrimidin-2-yl)aminocarbonyl]-3-bromo-4-ethoxycarbonyl-1-methylpyrazole-5-sulfonamide, N-[(4,6-dimethoxypyrimidin-2-yl)aminocarbonyl]-3-bromo-4-ethoxycarbonyl-1-methylpyrazole-5-sulfonamide and N-(methoxycarbonyl-1-phenyl sulfonyl-N'-(bis-difluoromethoxy pyrimidin-2-yl)urea.

Other herbicidal imidazolinone or imidazolidinone or -dione compounds within the purview of this invention which may be safened for use in various crops include the compounds disclosed in the following exemplary publications: EP Numbers 041623, 198552 and 216360; JA 1109-790, JA 1197-580A, GB 2 172 886A, J6 1183-272A and and Australian published Application No. AU 8661-073A and U.S. Pat. Nos. 4,188,487, 4,297,128, 4,647,301, 4,638,068, 4,650,514, 4,562,257, 4,554,013, 4,709,036, 4,749,404 and 4,741,767.

Still other classes of herbicidal compounds contemplated for combination with the antidotes of this invention include the following representative species:

Triazines and triazinones: 2,4-bis-(isopropylamino)-6-methylthio-1,3,5-triazine ("prometryn"), 2,4-bis-(ethylamino)-6-methylthio-1,3,5-triazine ("simetryn"), 2-(1',2'-dimethylpropylamino)-4-ethylamino-6-meth-

ylthio-1,3,5-triazine ("dimethametryn"), 2-chloro-4,6-bis-(ethylamino-1,3,5-triazine ("simazine"), 2-tert-butylamino-4-chloro-6-ethylamino-1,3,5-triazine ("terbuthylazine"), 2-tert-butylamino-4-ethylamino-6-methoxy-1,3,5-triazine ("terbumeton"), 2-tert-butylamino-4-ethylamino-6-methylthio-1,3,5-triazine ("terbutryn"), 2-ethylamino-4-isopropylamino-6-methylthio-1,3,5-triazine ("ametryn") and 3,4-bis(methylamino)-6-tert-butyl-4,4-dihydro-1,2,4-triazin-5-one.

Benzoic acid derivatives: 5-(2'-chloro-4'-trifluoromethylphenoxy)-2-nitrobenzoic acid ("Acifluorfen") and 2,6-dichlorobenzonitrile ("dichlobenil").

Oxadiazolones: 5-tert-butyl-3-(2',4'-dichloro-5'-isopropoxyphenyl)-1,3,4-oxadiazol-2-one ("Oxadiazon").

Phosphates: S-2-methylpiperidinocarbonylmethyl O,O-dipropyl phosphorodithioate ("Piperophos").

Pyrazoles: 1,3-dimethyl-4-(2',4'-dichlorobenzoyl)-5-(4'-tolylsulfonyloxy)-pyrazole.

Also α -(phenoxyphenoxy)-propionic acid derivatives and α -pyridyl-2-oxyphenoxy)-propionic acid derivatives.

As will be appreciated by those skilled in the art, the practice of this invention comprises the use of the novel antidotal compounds disclosed and claimed herein with any herbicidally-active compound. Obviously, the above listings of exemplary compounds is not intended to be exhaustive, but representative. Again, as noted earlier herein, it is expected that not every combination of herbicide and antidote will result in safening of all crops, but is within the skill of the art to test any given herbicide with an invention antidote in plant screens of any spectrum of plants and note the results.

The foregoing embodiments illustrate that the combinations of herbicide and antidote of this invention are useful in controlling weeds while reducing herbicidal injury to crop plants under greenhouse and field test conditions.

In field applications, the herbicide, antidote, or a mixture thereof, may be applied to the plant locus without any adjuvants other than a solvent. Usually, the herbicide, antidote, or a mixture thereof, is applied in conjunction with one or more adjuvants in liquid or solid form. Compositions or formulations containing mixtures of an appropriate herbicide and antidote usually are prepared by admixing the herbicide and antidote with one or more adjuvants such as diluents, solvents, extenders, carriers, conditioning agents, water, wetting agents, dispersing agents, or emulsifying agents, or any suitable combination of these adjuvants. These mixtures may be in the form of particulate solids, granules, pellets, wettable powders, dusts, solutions, aqueous dispersions, or emulsions.

Examples of suitable adjuvants are finely-divided solid carriers and extenders including talcs, clays, pumice, silica, diatomaceous earth, quartz, Fuller's earth, sulfur, powdered cork, powdered wood, walnut flour, chalk, tobacco dust, charcoal, and the like. Typical liquid diluents include Stoddard's solvent, acetone, methylene chloride, alcohols, glycols, ethyl acetate, benzene, and the like. Liquids and wettable powders usually contain as a conditioning agent one or more surface-active agents in amounts sufficient to make a composition readily dispersible in water or in oil. The term "surface-active agent" includes wetting agents, dispersing agents, suspending agents, and emulsifying agents. Typical surface-active agents are mentioned in U.S. Pat. No. 2,547,724.

Compositions of this invention generally contain from about 5 to 95 parts herbicide-and-antidote, about 1 to 50 parts surface-active agent, and about 4 to 94 parts solvent, all parts being by weight based on the total weight of the composition.

Application of the herbicide, antidote, or mixture thereof, can be carried out by conventional techniques utilizing, for example, hand-carried or tractor-mounted spreaders, power dusters, boom and hand sprayers, spray duster, and granular applicators. If desired, application of the compositions of the invention to plants can be accomplished by incorporating the compositions in the soil or other media.

The crop may be protected by treating the crop seed with an effective amount of antidote prior to planting. Generally, smaller amounts of antidote are required to treat such seeds. A weight ratio of as little as 0.6 parts of antidote per 1000 parts of seed may be effective. The amount of antidote utilized in treating the seed may be increased if desired. Generally, however, a weight ratio of antidote-to-seed weight may range from 0.1 to 10.0 parts of antidote per 1000 parts of seed. Since only a very small amount of active antidote is usually required for the seed treatment, the compound preferably is formulated as an organic solution, powder, emulsifiable concentrate, water solution, or flowable formulation, which can be diluted with water by the seed treater for use in seed treating apparatus. Under certain conditions, it may be desirable to dissolve the antidote in an organic solvent or carrier for use as a seed treatment of the pure compound alone may be used under properly controlled conditions.

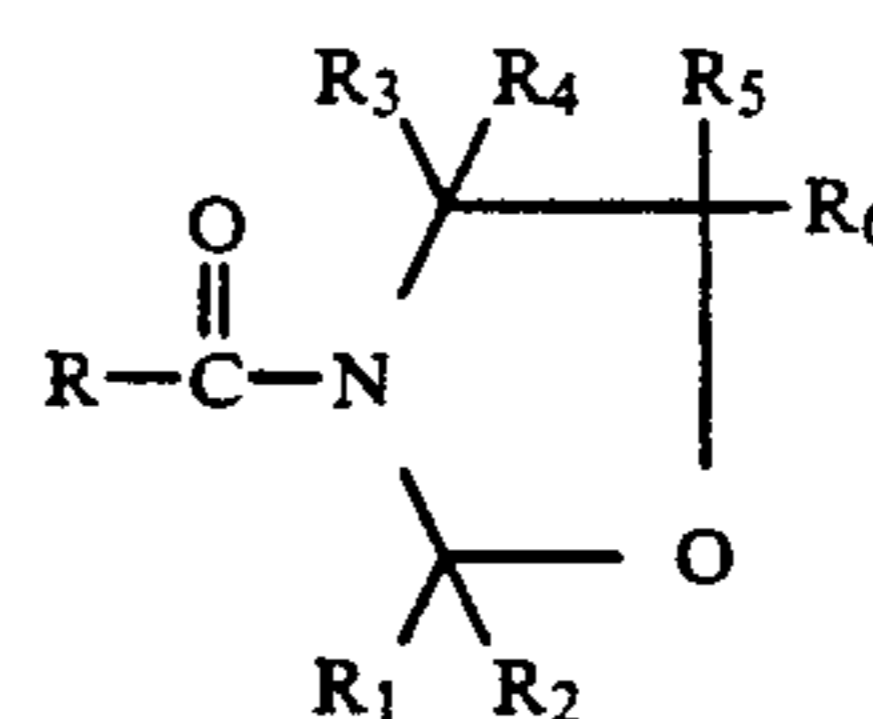
For antidote seed-coating or for antidotes applied to soil in granular or liquid formulations, suitable carriers may be either solids, such as talc, sand, clay, diatomaceous earth, sawdust, calcium carbonate, and the like, or liquids, such as water, kerosene, acetone, benzene, toluene, xylene, and the like, in which the active antidote may be either dissolved or dispersed. Emulsifying agents are used to achieve a suitable emulsion if two immiscible liquids are used as a carrier. Wetting agents may also be used to aid in dispersing the active antidote in liquids used as a carrier in which the antidote is not completely soluble. Emulsifying agents and wetting agents are sold under numerous tradenames and trademarks and may be either pure compounds, mixtures of compounds of the same general groups, or they may be mixtures of compounds of different classes. Typical satisfactory surface active agents which may be used are alkali metal higher-alkylarylsulfonates such as sodium dodecylbenzenesulfonate and the sodium salts of alkylnaphthalenesulfonic acids, fatty alcohol sulfates such as the sodium salts of monoesters of sulfuric acid with n-aliphatic alcohols containing 8-18 carbon atoms, long-chain quaternary ammonium compounds, sodium salts of petroleum-derived alkylsulfonic acids, polyethylene sorbitan monooleate, alkylaryl polyether alcohols, water-soluble lignin sulfonate salts, alkali casein compositions, long-chain alcohols usually containing 10-18 carbon atoms, and condensation products of ethylene oxide with fatty acids, alkylphenols, and mercaptans.

Although this invention has been described with respect to specific embodiments, the details of these embodiments are not to be construed as limitations. Various equivalents, changes, and modifications may be made without departing from the spirit and scope of this

invention, and it is understood that such equivalent embodiments are part of this invention.

We claim:

1. Compounds according to the formula



or the agriculturally-acceptable salts thereof wherein

R is halomethyl;

R₁ is C₁₋₄ alkyl, haloalkyl or phenyl;

R₂-R₅ are H or C₁₋₄ alkyl;

R₆ is a saturated or unsaturated C₅₋₁₀ heterocyclic radical containing 1 or 2 oxygen, nitrogen or sulfur atoms, optionally substituted with a C₁₋₄ alkyl or haloalkyl radical or halogen atom or with oxygen on a ring nitrogen atom; and

R₅ and R₆ may be combined to form a spiroheterocyclic ring as defined for the R₆ radical.

2. Compounds according to claim 1 wherein R is a dihalomethyl radical.

3. Compounds according to claim 2 wherein said radical is a dichloromethyl radical.

4. Compounds according to claim 3 wherein R₁ and R₂ are both C₁₋₄ alkyl radicals.

5. Compounds according to claim 4 wherein said alkyl radicals are methyl.

6. Compounds according to claim 5 wherein R₃, R₄ and R₅ are hydrogen.

7. Compounds according to claim 6 wherein R₆ is a C₅ heterocyclic radical containing oxygen as the hetero atom.

8. Compound according to claim 7 which is oxazolidine, 3-(dichloroacetyl)-5-(2-(2-furanyl)-2,2-dimethyl).

9. Compounds according to claim 6 wherein R₆ is C₆ heterocyclic radical containing nitrogen as the hetero atom.

10. Compound according to claim 9 which is oxazolidine, 3-(dichloroacetyl)-5-(3-pyridyl)-2,2-dimethyl.

11. Compounds according to claim 6 wherein R₆ is a C₅ heterocyclic radical containing sulfur as the hetero atom.

12. Compound according to claim 11 which is oxazolidine, 3-(dichloroacetyl)-5-(2-thienyl)-2,2-dimethyl.

13. Compounds according to claim 3 wherein R₁ is trifluoromethyl and R₂ is C₁₋₄ alkyl.

14. Compounds according to claim 13 wherein R₂ is methyl and R₃, R₄ and R₅ are hydrogen.

15. Compounds according to claim 14 wherein R₆ is a C₅ heterocyclic radical containing oxygen as the hetero atom.

16. Compound according to claim 15 which is oxazolidine, 3-(dichloroacetyl)-5-(2-furanyl)-2-methyl-2-(trifluoromethyl).

17. Compounds according to claim 14 wherein R₆ is a C₅ heterocyclic radical containing sulfur as the hetero atom.

18. Compounds according to claim 16 which comprises a mixture of the cis- and trans-isomers of oxazolidine, 3-(dichloroacetyl)-2-methyl-5-(2-thienyl)-2-trifluoromethyl).

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